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Teacher Learning Within Professional Learning Communities

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TEACHER LEARNING WITHIN PROFESSIONAL LEARNING COMMUNITIES

A Dissertation

Presented to the

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by

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ABSTRACT

Professional Learning Community (PLC) structures require focused sessions of teacher collaboration as part of developing effective instructional practices leading to improved student performance outcomes. The PLC structured collaboration model has been implemented in schools across the country, however the current body of research regarding PLC structures has been focused on student performance and rather than the teacher learning processes that occur within the model. Teachers must learn throughout the PLC model, as they collaborate, plan instruction, create assessments, analyze data, and adjust implementation to improve results.

A mixed-methods approach was used to explore correlations between PLC structure ratings and teacher self-identified learning preferences, with Kolb's (1984) Experiential Learning Theory as the basis for determining learning preferences. The study included 115 elementary teacher participants from a school district that has prioritized PLC structures for nearly 10 years. Significant correlations were identified between PLC structural elements and teacher learning preferences, with qualitative results providing additional descriptive analysis regarding teacher perceptions of their learning within PLCs. The findings within this study indicate that teacher learning preferences may be a key consideration for school site administrators as part of PLC team construction and development.

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INTRODUCTION

Statement of the Problem

Elementary and secondary school sites around the country have implemented practices and procedures intended to lead to student performance success on both state and federal accountability measures that has accompanied the implementation of the No Child Left Behind (2001) and subsequent reauthorizations of the Elementary and Secondary Education Act (2010). These implementations have varied in form, affecting classroom instructional techniques, student performance measurement systems at the local school site level, and expectations of teacher and student performance within the classroom. The transition to the Common Core State Standards has continued a need for teacher collaborative practice in order to develop instructional systems aligned to successful student performance outcomes.

One system that has been adopted by many public school districts is the Professional Learning Communities (PLCs), the current design of which was developed by DuFour and Eaker (1998). Through the PLC model, schools utilize their department and grade level teacher teams as collaborative learning groups, requiring them to use data from common assessments to determine best instructional practices for their students and implement them through collaboratively planned lesson implementation (DuFour & Eaker, 1998). The

implementation of such systems has varied in structure from district to district as well as from school site to school site, as each group of educators must go through team building stages as part of the collaborative process while focusing on the tenets of the PLC. As with most implementation systems in education, effectiveness of PLC group practices varies. Some school sites have achieved high levels of success through their collaborative practices, while other schools have made slower gains as based on accountability measures.

School site administrators are tasked with building instructional teams to produce high levels of academic performance as it applies to student learning and state and federal accountability measures. Site principals work through an annual process of analyzing student performance data from local assessments, comparing it to state and federal accountability testing results, and reconfiguring teaching staff members in an effort to improve performance at the classroom, grade or department, and school level. This process takes on many forms, including observed and evaluated teacher instructional capacity, level of implementation of instructional and classroom management techniques, and instinct on where individuals would be the "best fit." The construction of meaningful teams within the school is part of collaborative capacity building, driving administrative decision-making processes as they relate to staff construction (DuFour & Marzano, 2011).

PLC models rely on teacher teams working together to meet student achievement goals. In order to do this, there is a focus on teacher learning

through instructional implementation experiences, data analysis, and collaborative planning. Participating teachers within highly effective PLC systems are intended to be professional learners, constantly searching to improve practice and student outcomes. Teacher learning through an inquiry-based method is supported through the structural PLC components (DuFour, DuFour, & Eaker, 2008; DuFour & Eaker, 1998), thus building school site cultures focused on both teacher development and student achievement (DuFour & Fullan, 2013; DuFour & Marzano, 2011).

Purpose of the Study

The purpose of this study was to examine teacher perception of effective PLC practices through their own learning preferences. Elementary school grade-level teacher teams are required to collaborate and learn from experience through the PLC model. Administrators attempt to construct teams that will be highly effective in reaching state and federal accountability measures and provide direction and feedback to the grade level teams in their process of meeting goals. However, teacher understanding of their learning styles and preferences may have an impact regarding their effectiveness within this structured learning community environment. With Kolb's (1984) Experiential Learning Theory (ELT) and associated learning preference models as the lens, this study asked teachers to evaluate their participation and effectiveness within PLC structures, determined which PLC practices are preferred by participating

teacher learning preference groups, and allowed for participants to reflect on their PLC practices after discovering their preferred learning style and associated strengths.

Research Questions and Hypotheses

The study focused on a driving question regarding teacher learning style relationship with PLC structures. The primary research question was:

- How do teacher perceptions of the effectiveness of the implementation and work within Professional Learning Community structures and strategies align with self-identified learning preferences?

Analysis of teacher learning styles, PLC performance perception, and teacher implementation of best practices were addressed as part of the research. Sub-questions as part of this process included:

- How do teachers within structured collaboration systems, such as PLCs, perceive their learning process?
- Do strong indications of teacher learning relate to strong ratings of PLC structures?

A hypothesis was developed to respond to the research questions. The hypothesis for this study was:

- Teacher-identified strengths of PLC structural component effectiveness will significantly correlate with self-identified teacher learning preferences.

A null hypothesis was developed in conjunction with the alternate hypothesis. The null hypothesis for the study was:

- There will be no correlation between PLC structural component effectiveness ratings and any self-identified teacher learning preference.

Theoretical Underpinnings

This study explored the structures of PLC systems as they interrelated with teacher learning preferences. PLC constructs as described by DuFour and Eaker (1998) are designed to structure teacher team collaboration targeting specific learning goals through data analysis and strategy development. Throughout this study, PLC structures were used as the primary collaborative systems of the participants, as all participants participate within these collaborative structures in their professional environment.

Kolb's (1984) Experiential Learning Theory (ELT) served as the primary theory within the regarding teacher learning preferences. Instrumentation and analysis of results used the Experiential Learning Model along with the self-identified learning preferences generated through the model.

Assumptions

Assumptions in this study involve the sample selection and participant responses used within the study. The sample was not randomly sampled from the entire elementary school teacher population; however there was an

assumption that the participating population used was representative of similar demographics within a similar sample group. Assumptions were also made that all participants responded to the items in all survey sections honestly and accurately to the best of their knowledge.

Limitations

This study was designed to be explorative in nature, reviewing relationships between teacher learning preferences and PLC structural components. The district selected met the requisite requirements for participation, however the district was chosen in part as a convenience sample, which affects generalizability. All participants were employed within the school district as elementary teachers at the time of the study, and therefore have experienced PLC structures as a district prioritized collaboration model.

The ELT survey was piloted with a small test sample as part of developing the instrument for this study. There were no validity or reliability measures for the ELT survey at the time of administration. This could be considered as a threat to the internal validity of the study. In addition, the *Critical Issues for Team* Consideration survey (DuFour, DuFour, Eaker, & Many, 2006) was crafted as a professional tool. There were no validity or reliability measures for the PLC survey, which may also be considered a threat to internal validity of the study. Further analysis, validity testing, and reliability testing of the survey

instrumentation must be made in order to use the instrumentation for further research.

PLC items were clustered using a qualitative coding system, not any type of cluster analysis. PLC survey items were grouped based on the PLC structural components referred to within the item text. This was a limitation to the study, as formal cluster analyses using a larger data set may indicate differences within item cluster groups.

The results of this study must be interpreted as time-based and cross-sectional in nature. Both PLC effectiveness and ELT learning preferences are affected by participant experience-based factors, limiting the results across multiple population groups. Therefore both the PLC ratings and the ELT preference scores must be taken within the context of participant experience at the time of completion.

Delimitations

The study will not be answering the research questions, “How effective are teachers with specific learning preferences in meeting PLC structural goals?” nor, “How do specific learning preferences affect performance of PLC teams?” This study does not address teacher effectiveness, PLC team goals, or a measure of team performance. This study solely focused on the exploration of connections between teacher perceptions of effective PLC practices through their experience

within the model and the correlations with teacher self-identified learning preferences.

This study does not control for factors such as gender, race, or teacher experience. Although this data was collected as part of describing the participant group, correlations between these factors, PLC items, and ELT learning preferences were not addressed within this study.

Definition of Terms

1. Experiential Learning Theory (ELT) – An adult learning theory developed and defined by Kolb (1984) consisting of two learning dimension continuums and four primary learning styles.
    a. Learning preferences – The designated learning preference indicated by the polar ends of each of Kolb's (1984) learning dimension continuum. These continuums are designated as the Abstract Conceptualization – Concrete Experience (AC-CE) continuum and the Active Experimentation – Reflective Observation (AE-RO) continuum.
        i. Abstract Conceptualization (AC) – One learning preferences within the AC-CE continuum, described as learning by thinking, answer seeking, and grasping by comprehension.
        ii. Concrete Experience (CE) – One of the learning preferences within the AC-CE continuum, described as learning by feeling, problem finding, and grasping by apprehension.

iii. Active Experimentation (AE) – One of the learning preferences within the AE-RO continuum, describes as learning by doing, verification, transformation by extension.

iv. Reflective Observation – One of the learning preferences within the AE-RO continuum, described as watching, question asking, and transformation by intention.

2. Professional Learning Communities (PLCs) – A systemic approach to teacher team collaboration developed by DuFour and Eaker (1998).

CHAPTER TWO

LITERATURE REVIEW

Introduction

The No Child Left Behind (2001) and Race to the Top reauthorizations of the Elementary and Secondary Education Act (2010) legislated the terms by which schools are evaluated based on student performance on common state-level assessments for over a decade. A variety of approaches were taken by schools, districts, and county offices of education in order to develop practices focused on increasing performance on state and federal accountability goals. During this process of professional development and systems-based implementations within the public school system, districts created structures involving statistical analysis and collaboration amongst teachers to develop instructional practices that led to increases in accountability measure results.

In the case of California, the state content standards developed in 1997 were used as the basis of creating assessments to determine student, school, and district performance to meet NCLB requirements. The Standardized Testing and Reporting (STAR) system was created, using the California Standards Test (CST), California Modified Assessment (CMA), California Alternate Performance Assessment (CAPA), and the California High School Exit Examination (CAHSEE) as the assessments to determine student proficiency. For over a decade, California's school districts made success on these measures a priority, with

many districts and schools incurring sanctions due to underperformance.

Recently, districts and most State Boards of Education have begun to transition towards implementing the Common Core State Standards (Common Core State Standards Initiative, 2010a, 2010c). These standards increased the rigor of instruction and expectations of student achievement within public schools. The Common Core State Standards (CCSS) require teachers to work together, collaboratively planning lessons involving real world application of skills and integrating ideas and concepts across disciplines. Due to this collaborative need, structures of collaborative practice must be in place to assist teachers in developing lessons and assessing student progress. Structural changes in school districts that started with meeting NCLB state and federal accountability measures continue to be refined during this transition towards Common Core State Standards implementation.

Starting in 2009, The Council of Chief State School Officers (CCSSO) and the National Governors Association for Best Practices began discussions regarding improving educational standards through a collaborative effort along with researchers, educators, and other educational stakeholder groups (Common Core State Standards Initiative, 2010d; Evenson, McIver, Ryan, & Schwols, 2013). The Common Core State Standards Initiative group was formed in order to develop these standards that would provide students with skills and concepts needed for college and careers of the 21st century. The final documents featuring the K-12 Common Core State Standards were approved in 2010, and

began the process of being adopted by the states for use in public K-12 schools. Forty-three states, Washington, D.C., and two territories had adopted the standards for both ELA and Mathematics, with Minnesota adopting only the ELA standards (Evenson et al., 2013). The numbers of participating states was fluctuating during the time of this dissertation study, with state legislatures and education stakeholders changing approaches.

Specific criteria were used by the Common Core State Standards Initiative (2010a, 2010b, 2010c) in developing the K-12 standards and the college- and career-readiness standards. Those criteria defined that the standards:

- Aligned with college and work expectations;
- Include rigorous content *and* application of knowledge through high-order skills;
- Build upon strengths and lessons of current state standards;
- Informed by top-performing countries, so that all students are prepared to succeed in our global economy and society; and,
- Evidence and/or research-based (Common Core State Standards Initiative, 2010d).

The CCSS target skills that allow students to be "college- and career-ready", stressing real-world application of skills and cross-disciplinary instructional routines (Calkins, Ehrenworth, & Lehman, 2012; Common Core State Standards Initiative, 2010d; Marzano et al., 2013). The CCSS require

changes in instructional systems and feature a change in the assessment battery used to determine student, school, and district performance. This leads to significant issues that need to be addressed within school structures within California K-12 public education, with school districts determining which current systems to keep and which to modify.

Districts in California were left to design their approach to implementing CCSS instructional systems into the schools. Portions of the STAR assessment system would be in effect through the 2013-2014 academic year, as the passing of Assembly Bill 484 changed the assessment requirements in California public schools to participate in the new Smarter Balanced Assessment Consortium (SBAC) assessments. The SBAC results would be used for test item leveling during the Spring 2014 assessment, and schools would neither receive information nor receive site accountability scores for the year. This gave schools and districts the ability to utilize collaborative practices that had begun within the NCLB model in order to develop approaches and practices to meet the rigorous expectations of CCSS, with accountability measures expected for the 2016-2017 academic year.

Professional Learning Communities

In many cases, schools and districts falling into Program Improvement status during the NCLB compliance model implemented measures that required teachers and administrators to be highly strategic in their instructional practices

and teaching models. One of the most utilized systems of teacher collaboration regarding the development of best instructional practices is the Professional Learning Community (PLC) model. As described by DuFour and Eaker (1998), PLCs require school teams to develop collaborative groups focused on student achievement. Six characteristics of PLCs are defined: shared mission, vision, and values; collective inquiry; collaborative teams; action orientation and experimentation; continuous improvement; and results orientation (DuFour & Eaker, 1998, pp. 25–29). Within these characteristics are underlying points focusing on student achievement, using data to drive decision-making processes, and continuous collaborative evolution of the teaching craft by the teams at the school site.

PLC structures are intended to be collaborative in design (DuFour & Eaker, 1998). These structures are initially limiting, as teacher teams struggle to go through various stages of team building to reach a state of performance that reflects student achievement. Although questions have been raised regarding PLC structures themselves being the source of student improvement (Servage, 2008), in many cases due to a lack of empirical research on the topic (Saunders, Goldenberg, & Gallimore, 2009), there is clear evidence that teacher collaboration that produces teacher learning is effective in practice (Cosner, 2011; Devlin-Scherer & Sardone, 2013; Lieberman & Miller, 2011). In many cases, PLC outcomes tie to structures of intervention, leading towards instructional systems that are routinized and complementary behavioral systems.

As teachers collaborate through the PLC system, they make decisions based on student assessment data. Meetings are structured under the paradigm that teachers control portions of the instructional decision-making so long as it aligns with statistical achievement outcomes (DuFour, DuFour, Eaker, & Karhanek, 2004; DuFour & Eaker, 1998). This allows administrators to frame their discussions to teachers as supportive of teacher ownership of collaborative products such as instructional plans and common assessments.

Teachers consistently struggle to know their role within these systems. These collaborative exercises lead to team building and improved levels of trust (Burns, 2012) and sharing amongst teams (Meirink, Imants, Meijer, & Verloop, 2010), assuming that the team leadership is strong and allows for the goals and objectives of the meeting sessions to be met (Horn & Little, 2010). Additionally, teacher teams that struggle with one or more areas of PLC structures tend to not show the same levels of "teamness" as others (Morr, 2010), which is more prevalent within Program Improvement schools where the results of collaborative sessions do not always lead to desired achievement results. Webb, Briscoe, and Mussman (2009) note, "High-stakes testing, then, is a disciplinary apparatus of schooling that holds educators accountable to produce stratified student identities through simple statistical deviations of test scores" (Webb et al., 2009, p.6). Intervention methods and progress monitoring systems are implemented as a response to student data (DuFour et al., 2004; DuFour & Marzano, 2011),

leading to students being monitored to insure that they are performing on certain skills.

Teacher teaming is often driven through a need to improve performance on state and federal accountability measures. In turn, increases in student performance in classroom learning should correspond to increases in assessment results. Saunders, Goldenberg, and Gallimore (Saunders et al., 2009) conducted a five year quasi-experimental study looking to measure gains in student performance between Title I schools and experimental schools using learning community concepts. The authors note a lack in literature regarding correlations between PLC structures and student achievement, however their own findings show "evidence that grade-level teams focused on improving student learning can produce school-level effects of both statistical and practical significance" (Saunders et al., 2009, p. 1026). Principal efforts in team construction and providing stable team groups should be a focus for school progress based on these findings. PLC structures are one possible collaborative design that focuses on improving student learning that align with these outcomes.

Professional Learning Communities (PLCs) or similar collaborative systems have been implemented as part of meeting content standards assessment targets during the NCLB compliance structure, and have continued within the CCSS transition. Schools that have these collaborative structures in place have an advantage moving into CCSS implementation. Since PLC

structures are designed to use standards language as a primary target for discussion through the interpretation and discussion of student formative data (DuFour & Eaker, 1998), these participating teachers are already familiar with developing practices and modifying systems to increase performance. A standards transition could be handled similarly to the way an instructional strategy transition occurs within the PLC system. In order to build a positive culture that is responsive and accepting of change, teachers and district staff continue to use effective collaborative practices in order to address the new levels of rigor present in CCSSs and determine the best course of practice (DuFour & Fullan, 2013).

This positivity should not minimize the frustration that is likely to occur within school sites regarding this large-scale change. Keeping positive cultures during times of change is a challenge when systems are stressed from every angle. DuFour and Fullan (2013) refer to a “loose-tight” leadership system in relation to PLC implementation, which may be similarly needed during the transition towards full CCSS implementation. Leadership needs to align their goals and priorities with their actions, determining which aspects to tightly monitor and implement and which targets are non-negotiable, while allowing for looser reins on how teams meet those goals. The entire effort of the “loose-tight” concept is to build ownership in the process from those involved, while continuing to push forward change agendas with clarity and purpose. Alignment of efforts will be key to keeping positive site cultures through the transition (DuFour &

Fullan, 2013). Leadership research within PLC and collaborative structures will be discussed later in this literature review.

Research has been conducted on various forms of the PLC model. As PLC models have been implemented and developed over time, researchers have analyzed their use in a variety of arenas. The foci of these studies have varied as well.

Student performance has been shown to benefit from PLC structures (Saunders et al., 2009), which allow teachers to use student assessment data through collaborative sessions to determine effective instructional practices (DuFour et al., 2008; DuFour & Eaker, 1998; DuFour & Marzano, 2011). PLC structures also assist in determining student struggles in meeting performance expectations, and develop intervention systems to assist students in need of additional academic support (DuFour et al., 2004; DuFour, DuFour, Eaker, & Karhanek, 2010).

The PLC process has been shown to be beneficial for teacher candidates via learning through collaboration targeting instructional strategy implementation (Rigelman & Ruben, 2012). The individuals in this study commented through their surveys that collaboration was the central reason for their development through the training program. Specific emphasis was given to the need for "flexibility, risk-taking, communication, and on-going reflection about their developing practice" (Rigelman & Ruben, 2012, p. 985).

Burns' (2012) case study regarding the PLC project in Missouri featured surveys conducted with eight schools regarding the level of implementation of the PLC process as it relates to reflective practices. In an effort to relate "the level and extent of reflective practice found in a school and the level of implementation of the professional learning communities process found in the school" (Burns, 2012), findings suggested that strong correlates existed between teaming, the number of reflective practices used, and the level of implementation of PLC structures. These findings indicate that creating group reflective practices requires teams be constructed with formal collaboration structures in mind to increase the effectiveness of collaborative practices.

Supervisors of student teachers also use PLC strategies and methods in developing their own shared expectations and problem solving. Case studies involving supervisors of instruction have shown that continued collaboration through defined understandings that are a basis for learning communities led to a further understanding of creating equity and improving self-reflective practices (Jacobs & Yendol-Hoppey, 2010).

There has been criticism regarding PLC associated methods. Servage (2008) is critical of PLCs as a system that does not focus on end goals, rather teacher learning as a way to determine best instructional practice (Servage, 2008).

Learning communities have been shown to promote reflection and analysis of instruction through discussion structures that target instructional

implementation. Professional development through collaborative practice is an outcome that is due to teacher ability to share information within the context of their own practice (Attard, 2012). Learning communities can become “learning incubation centers” (Attard, 2012) so long as the collaborative structure is such that shared concepts and opinions are targeted towards continuous improvement of instructional implementation.

Brinkmann and Twiford (2012) identify needed collaborative skills through their study on co-teaching practices. These skills include communication, data collection and analysis, interpersonal communication skills, and self-advocacy as some of the most vital skills for collaborative success as identified by general education teachers (Brinkmann & Twiford, 2012).

Cranston (2009) identifies eight themes that principals indicated are vital to the success of PLC structures within schools. These are a focus on process, structural supports for development of PLC practices, trust, relationships focused on developing a community, learning as an individual activity, attitudinal attributes within teaching, teacher evaluation that supports learning in PLCs, and the relationships built between teachers and administrators to support PLCs (Cranston, 2009).

Questions arise regarding the relationships of PLCs and Communities of Practice (CoP). Advocates for collaborative structures express preference for the structures of both systems, which align well in their attempts to increase the capacity of group members through collaborative practice. Lee and Shaari

(2012) focus on these two structures, concluding that both structures have merit due to differing approaches. Where PLCs have structural designs that are systemically implemented, CoPs have structures that generate from an inquiry-oriented basis of developing structures. Lee and Shaari (2012) determined that both systems are complimentary, and may lead to best collaborative results through use of both structures over time. In either organizational pattern, collaborative practice looks to improve instructional outcomes which is reliant on positive and productive interactions between team members.

Collaborative Learning and Leadership

> How someone learns depends on the larger system in which he or she learns. Elements of the system (both individual learners and other system elements) cannot be understood independently. Rather, the interactions of the elements give rise to emergent behaviors that would not arise through independence. (Opfer & Pedder, 2011, p. 381)

Within the PLC model, there is a requirement to pursue full and total collaboration between the teachers on the various teams within the school site. Regarding collaboration as it relates to change, Fullan (1993) wrote, “In short, without collaborative skills and relationships it is not possible to learn and to continue to learn as much as you need in order to be an agent for social improvement” (Fullan, 1993, pp. 17-18).

Horn and Little's (2010) study regarding routines within team collaboration provides a good lens into the need for well constructed collaborative teams and systems. Two different teams reached far different outcomes through their collaborative sessions based in large part on "the way normalizing practices functioned in combinations with other moves in interaction to turn the conversation *toward* the teaching or *away from* the teaching as an object of collective attention" (Horn & Little, 2010, p. 192). The authors used the transcriptions from discussions within teacher collaborative meetings to show a difference in the conceptual resources for effectively discussing problems within their lesson implementation and assessment results. Leadership within groups seemed to have a major effect as well, with the Algebra leadership teachers "maintaining an ethos of professional learning" (Horn & Little, 2010, p.210) while their Academic Literacy Group counterparts who modeled a more shared leadership model focused on dividing work (Horn & Little, 2010). The differential in the routines of these teams made for a large discrepancy in effectiveness, which may be mitigated by the way that the teams are constructed.

Teacher learning needs to be part of all collaboration within the site according to the reflective inquiry component of PLC models (DuFour & Eaker, 1998). Meirink, Imants, Meijer, and Verloop (2010) conducted a comparative case study regarding the collaborative practices within five different collaborative teams. Defined systems of sharing were identified, further classified by the content and function of the sharing experiences as it applied to collaborative

learning. Sharing within the teams fell into two subcategories: "(1) the content of exchanges (*exchanging ideas for alternative teaching methods and exchanging and discussing experiences of experimentation* with alternative teaching methods); and (2) the problems that were identified (identifying and solving *shared* or *individual* instructional problems)" (Meirink et al., 2010, pp. 174-175). The authors concluded that there was a necessary level of interdependence amongst team members that was needed in order for productive sharing discourse to occur.

Teacher learning and professional development has been connected to the systems through which they interact. Opfer and Pedder (2011) conclude through their literature review that some systems are vital to teacher development, a focus aspect within PLC teacher team systems. The authors state that learning environments must be across all parts of a school, self-evaluation must be present, consistent examination of core values and beliefs, and "systems of knowledge management that leverage resources, core capabilities, and expertise of staff and pupils" must be in place for teacher learning (Opfer & Pedder, 2011). This connection is cautioned, as administration has an impact on these structures, and these behaviors are exhibited in teacher team creation within school sites. This supports the need for administrators to have detailed knowledge of the strengths of their teaching staff when creating teams to insure that teams are as effective as possible.

Burns' (2012) case study regarding the PLC project in Missouri featured surveys conducted with eight schools regarding the level of implementation of the PLC process as it relates to reflective practices. In an effort to relate "the level and extent of reflective practice found in a school and the level of implementation of the professional learning communities process found in the school" (Burns, 2012), findings suggested that strong correlates existed between teaming, the number of reflective practices used, and the level of implementation of PLC structures. These findings indicate that creating group reflective practices requires teams be constructed with formal collaboration structures in mind to increase effectiveness of collaborative practices.

Collaboration is a defined focal point in developing new practices and leadership roles within the school environment. Leadership can be driven through a collaborative process of developing action plans for the whole site. Concepts determined by the leadership team become part of the normal culture of the school through the diffusion of the selected reform stages (Adams & Jean-Marie, 2011). Building reforms through collaborative leadership leads to shared vision and continues the development of the school culture as it relates to meeting established implementation goals (DuFour & Marzano, 2011).

Brouwer, Brekelmans, Nieuwenhuis, and Simons (2012) used multiple methods to study how communities of teachers develop effectively. Although the teachers showed limited perceptions regarding the development of their teams, the results indicated that the managers of the teams played a role in constructing

teams and supporting their development as part of creating a site culture of collaboration. Support from administration is needed to develop a culture that sustains the collaborative structure defined within Professional Learning Communities.

DuFour and Marzano (2011) give a list of factors that must be considered by administrators. These include the prospective leader's influence on their peers, advocacy for being a promoter of PLC concepts, persistence and efficacy, and their ability to think systematically (DuFour & Marzano, 2011, pp. 57–58). As administrators learn about the strengths of the teachers at the school site, they are better equipped to determine the composition of the collaborative groups within teacher teams.

These collaborative leadership skills are not innate. Maxfield and Klocko (2010, p. 13) stated in their analysis of collaborative leadership:

> While it has been recognized that collaborative leadership may be an essential component in school improvement, typically educators have limited training or experience in participatory leadership, negotiation skills, and/or collaborative decision-making.

These are learned skills, reflective of the implementation of professional development on the topic and developing perspectives regarding collaboration.

Trust is also a major indicator of success within collaborative leadership, both from the teacher level and the managerial or

administrative levels (Barbour, 2005; Coleman, 2012). Coleman (2012) explores the connection of trust and collaboration thoroughly, shaping trust past the traditional forms of ideological and behavioral trust, honoring the importance of perceptual trust within collaborative structures. Trust in the context of true collaboration focuses on more than the structures and outcomes of the action, extending to the opinions of others within collaborative structures. Leadership combines with collaboration, as the trust in the collaborative process and understanding how individuals work together is necessary for developing the trust-based culture required for successful collaborative processes to affect change in practice (Coleman, 2012; Tschannen-Moran, 2004).

Accountability is a uniting force between collaborative practice and leadership actions. Hourcade, Parette, and Anderson (2003) defined a structure for evaluating collaboration through the combination of objective and subjective data relating to processes and outcomes. As a leader further defines whether collaborative structures are operating within defined parameters, such as those outlined within PLCs and corresponding teacher leadership actions to support those efforts (DuFour et al., 2008; DuFour & Marzano, 2011), clear understanding of the meaning of collected accountability data and structured feedback to the team must be in place to define whether teams are meeting expectations (DuFour & Fullan, 2013; DuFour & Marzano, 2011; Hourcade et al., 2003).

Clear understanding of team goals and formalized collaboration structures and expectations assists in clarifying accountability requirements, making collaborative time more effective and allowing leadership, both administrative and teacher level, to become more targeted in their use of time.

Hunzicker (2012) further defines how teacher leadership is developed, an important concept within PLC structures, the implementation of Common Core State Standards, and collaborative culture development within a school site (DuFour & Fullan, 2013; DuFour & Marzano, 2011; Fullan, 2001; Marzano et al., 2013). Three factors were directly aligned with teacher leadership development within the study. These practices were exposure to research-based strategies, service outside of the classroom, and increases in teacher self-efficacy (Hunzicker, 2012). Connections to job-related collaboration structures and professional inquiry were identified as beneficial structures in order to increase leadership through the three identified factors (Hunzicker, 2012).

School administrators target growth when constructing teams at their school sites. Each team develops a culture of collaborative practice, changing in effectiveness based on the individuals working together being able to construct trust and develop practices that allow all to contribute to the group development. These smaller cultures combine to create the overall school site culture, which then takes on the traits of the smaller

collaborative cultures at the site. Understanding the cultures present on each team, along with their strengths and weaknesses, allows administrators to make personnel decisions within each team in order to build a the larger site culture (Barbour, 2005).

Experiential Learning Theory

Kolb (1984) developed Experiential Learning Theory using the work of Dewey, Lewin, and Paiget as a foundation. Experiential Learning Theory (ELT) is an adult learning theory that is utilized throughout higher education. Rooted in organizational studies and business sector programs (D. A. Kolb, 1984), ELT has been used to determine instructional delivery and student interaction methods that best suite the needs of individual students. Determining student learning styles through the use of the Learning Styles Inventory (LSI) (D. A. Kolb, 1984), students and educators have altered their approach towards the dissemination of and interaction with course content to improve the alignment with the traits best suited for each learning style. Experiential learning focuses on personal experience as the basis for developing knowledge through understanding the context of the experience and the learner's ability to generalize the information to other experiences (D. A. Kolb, 1984; Loo, 2004; Manolis, Burns, Assudani, & Chinta, 2013). This thought process suggests that all learning is defined through the lens of the learner as part of a process of learning, as opposed to identifying facts and concepts through presentations.

The Experiential Learning Model is based on six propositions (A. Y. Kolb & Kolb, 2005; Manolis et al., 2013):

1. Learning is best conceived as a process, not in terms of outcomes.
2. Learning is a continuous process grounded in experience.
3. Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world.
4. Learning is a holistic process of adaptation.
5. Learning results from synergistic transactions between the person and the environment.
6. Learning is the process of creating knowledge. (Manolis et al., 2013, p. 45)

Kolb (1984) further defines learning within the ELT model through defining four learning modes. These modes align learning along two continuums, placing the learner within the interrelated features of the learning modes to define common learning styles. The modes as defined through ELT are concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE) (D. A. Kolb, 1984; Manolis et al., 2013). Each continuum, or dimension, is determined by the polarity of each of the modes. Kolb (1984) presents the continuums as the abstract conceptualization-concrete experience dimension (AC-CE continuum) and active experimentation-reflective observation dimension (AE-RO continuum). The AC-CE continuum focuses on perception, with experiences defined through connections to abstractness of the

concept versus concreteness. In contrast, the AE-RO continuum focuses on the processing by the learner, whether through active or reflective interaction with the learning experience.

Kolb (1984) displays these dimensions on a coordinate plane (Figure 1), creating four quadrants into which learner types can be identified and generalized. These generalized learner types are defined by Kolb (1984) as learning styles.

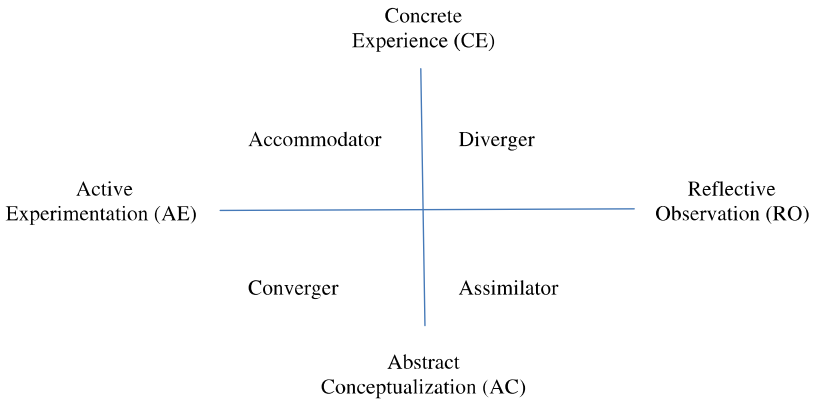

Figure 1
Kolb's Experiential Learning Model
Source: Manolis, C., Burns, D. J. ., Assudani, R., & Chinta, R. (2013). Assessing experiential learning styles: A methodological reconstruction and validation of the Kolb Learning Style Inventory. *Learning & Individual Differences*, *23*, 44–52. http://doi.org/10.1016/j.lindif.2012.10.009

ELT has been used to describe learning as a continuing cycle of learning, including components of experience, reflection, and action (Demirbas & Demirkan, 2007; D. A. Kolb, 1984). Most learners do not go through all four

learning styles or phases during their development. Rather, most learners prefer to utilize skills and attributes consistent with one quadrant for most approaches, finding benefit in the common attributes of each learning style. ELT does not define any learning style as more or less effective than another, rather fluid and tailored towards the individual learner (Demirbas & Demirkan, 2007; D. A. Kolb, 1984).

Learning Styles

As part of his work in developing the Experiential Learning Theory, Kolb (1984) developed the Learning Styles Inventory (LSI). The LSI uses force rank responses that label participants into four basic learning styles: convergent, divergent, assimilation, and accommodative (D. A. Kolb, 1984). Each learning style associates with learning preferences and traits best suited to the attributes of each style type.

Kolb defined four learning style preferences, labeling each to apply to the preferred instructional method and common attributes of those individuals (D. A. Kolb, 1984). The Diverger style focuses on interactions and feedback, preferring to work in groups and listening to other opinions. Accomodators also prefer to work in groups, but are focused on task completion with defined goals and using trial and error methods. Assimilators prefer reading and deep thought, exploring various models analytically in a more independent setting. Finally, Convergers experiment with new concepts and ideas through practical application, often

searching for the one correct answer to the problem (A. Y. Kolb & Kolb, 2005; D. A. Kolb, 1984; McCarthy, 2010).

Style differences have been explored through a variety of lenses. Cultural impact on learning styles has been studied through lenses of gender, age, and country of origin attempting to determine correlations between these demographics and learning preferences (deCiantis & Kirton, 1996; Demirbas & Demirkan, 2007; Joy & Kolb, 2009; Loo, 2004). Joy and Kolb (2009) found various impacts of culture on learning style preferences based on the orientation of the society, the level of assertiveness within the culture, and avoidance of uncertainty. For instance, collectivist cultures and cultures oriented on future outcomes showed distinct preferences for abstract conceptualization over concrete experience, while cultures focused on assertiveness showed a correlation with reflective traits within learning styles (Joy & Kolb, 2009).

Kolb's initial research and development for the LSI included an analysis of behavior patterns of each learning style through various lenses (A. Y. Kolb & Kolb, 2005; D. A. Kolb, 1984; McCarthy, 2010). Two of these lenses, professional career and current job role, tie directly into traits associated with educators. Elementary level educators were generally found to have a orientation towards active experimentation and a high orientation toward concrete experience, placing individuals in this professional in the assimilation learning style (D. A. Kolb, 1984). Connections were drawn between job types and learning styles. Informational jobs are linked to the assimilation learning

style (D. A. Kolb, 1984), consistent with the planning, research, and conceptual modeling skills needed in elementary education teaching positions.

Kolb (1984) defines learning through four distinct learning styles. Each style is defined through its location within the two dimensions of learning. Learning strengths and tendencies are defined within each style, reflective of each learner's approach to a given experience and the perception of the experience.

Accomodators are identified within the concrete experience and active experimentation quadrant of the model (D. A. Kolb, 1984; Manolis et al., 2013). This combination manifests itself through very active participation in experiences, experimenting with new knowledge in a variety of contexts to further test the extent of the new knowledge base (A. Y. Kolb & Kolb, 2005). Accomodators can be best defined as "go-getters" who enjoy new experiences and implement plans willingly (Turesky & Gallagher, 2011).

Divergers are identified within the concrete experience and reflective observation quadrant of the model (D. A. Kolb, 1984; Sugarman, 1985). Strengths of this learning style include an ability to relate to other viewpoints and creativity (Turesky & Gallagher, 2011). Through their preference for reflective observation, divergers look back over their concrete experiences and make generalizations based on multiple viewpoints and perspectives of the original experience. Through this process, the diverger creates meaning by learning from each viewpoint (DiMuro & Terry, 2007; Manolis et al., 2013). Although they

share the preference for concrete experience with the accommodator learning style, divergers take a less systematic approach and use creativity in their learning (Demirbas & Demirkan, 2007; A. Y. Kolb & Kolb, 2005).

Convergers differ from the above types in that they learn through abstract conceptualization (D. A. Kolb, 1984; Sugarman, 1985). Although they are identified within the active experimentation end of the AE-RO continuum, convergers prefer to experiment with ideas through simulations, scripted plans, and practical applications of theories and concepts (A. Y. Kolb & Kolb, 2005). Convergers tend to be optimal decision-makers and goal-setters due to their technical understanding and plans (DiMuro & Terry, 2007).

The Assimilator type inhabits the abstract conceptualization and reflective observation sector of the model (D. A. Kolb, 1984; Sugarman, 1985). As their learning style name would indicate, assimilators amass significant amounts of information and arrange it as logically as possible to produce learning outcomes (DiMuro & Terry, 2007; Manolis et al., 2013). These learners are very systematic and highly analytical in their approach to learning, and tend to be very successful in traditional lecture format classroom structures when given time to process the information (A. Y. Kolb & Kolb, 2005; Turesky & Gallagher, 2011).

Each learning style is further defined regarding preferred instructional method and common attributes of those individuals that identify each style as preferred (D. A. Kolb, 1984). The Diverger style focuses on interactions and feedback, preferring to work in groups and listening to other opinions by using

their interpersonal relationship strengths. Accomodators also prefer to work in groups, but are focused on task completion with defined goals and using trial and error methods. Assimilators prefer reading and deep thought, exploring various models analytically in a more independent setting. Finally, Convergers experiment with new concepts and ideas through practical application, often searching for the one correct answer to the problem (A. Y. Kolb & Kolb, 2005; D. A. Kolb, 1984; Manolis et al., 2013; McCarthy, 2010; Turesky & Gallagher, 2011).

Learning style differences have been explored through a variety of lenses. Cultural impact on learning styles has been studied through lenses of gender, age, and country of origin attempting to determine correlations between these demographics and learning preferences (deCiantis & Kirton, 1996; Demirbas & Demirkan, 2007; Joy & Kolb, 2009; Loo, 2004). Joy and Kolb (2009) found various impacts of culture on learning style preferences based on the orientation of the society, the level of assertiveness within the culture, and avoidance of uncertainty. For instance, collectivist cultures and cultures oriented on future outcomes showed distinct preferences for abstract conceptualization over concrete experience, while cultures focused on assertiveness showed a correlation with reflective traits within learning styles (Joy & Kolb, 2009).

Kolb (1984) does assert that effective learners can transition between styles as dictated by specific experiences (Gogus & Gunes, 2011; A. Y. Kolb & Kolb, 2005), however most studies attempt to correlate specific learning styles with learning structures or demographics. Since learning styles are self-identified

through the use of the LSI or similar instrument, most studies utilize the learning preferences identified by participants within the time period and context of the study. Researchers need to understand that the same participant group may have shifts in their identification of preferred learning styles if participating in future studies due to the transitional nature of the styles themselves.

There have been multiple revisions of the LSI, each adding additional validity or new norms (McCarthy, 2010), with the most recent version, published by the Hay Group, expanding the original four learning styles to nine learning styles. This nine-style model, expanded through the work of Abbey, Hunt, and Weiser (1985), allows for balancing of the four original styles, making the directionally labeled styles of Northerner, Southerner, Easterner, and Westerner share attributes with the original four types (Demirbas & Demirkan, 2007). Support for the internal reliability and validity of LSI versions has been found by researchers, including analyses of the LSI-3 through multiple structures (Kayes, 2005).

Learning styles determined through the use of the LSI have been examined for use in higher education throughout research, looking at learning styles as a basis for developing instruction (McCarthy, 2010). Kolb (1984) ties experiential learning theory to the higher education setting as well as organizational development in his work. Classroom assignments (Stokes-Eley, 2007), higher education class formats (Abdulwahed & Nagy, 2009; McCarthy, 2010), and teacher and student approaches to collaboration and instruction (Lin,

2011; Rosenfeld & Rosenfeld, 2006) have been part of research involving Experiential Learning Theory. Learning traits, such as cognitive spontaneity, have also been connected to specific learning styles (Bozionelos, 1996).

Kolb has participated in additional research regarding how learning styles work in conjunction with other theories of learning to add complexity and depth to student work (Joy & Kolb, 2009; Alice Y. Kolb & Kolb, 2010; A. Y. Kolb & Kolb, 2005; Mainemelis, Boyatzis, & Kolb, 2002). For instance, use of extensions of learning styles including discussions regarding learning spaces, connecting the physical environment with individual learning styles both in higher education environments (A. Y. Kolb & Kolb, 2005) and through more free-flowing ludic learning spaces (Alice Y. Kolb & Kolb, 2010).

It is important to note that each learning style is identified by each learner through their own selection of their learning patterns within experiences. As part of his work in developing ELT, Kolb (1984) developed the Learning Styles Inventory (LSI). The LSI uses force rank responses that label participants into the four learning styles, allowing participants to use the instrument as a self-identification tool to determine their learning style preference (D. A. Kolb, 1984).

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found by researchers, including analyses of the LSI-3 through multiple structures (Kayes, 2005).

Kruzich, Friesen, and Van Soest (1986) used the LSI to assess the preferred learning styles of students in two different university programs, developing a connection between learning styles and instructional preference. The outcomes suggest that varying the styles of instruction and learning experiences will produce positive outcomes for a collective group, as individuals within a classroom are likely to have different learning styles and learning preferences (Kruzich et al., 1986).

Connecting learning styles and learning preferences has led to various results in empirical research studies. Loo (2004) attempted to correlate learning styles identified using the LSI and a learning preference. Similar to other studies, Loo (2004) was able to establish limited statistical significance in linking the two concepts. Enjoyment in learning seems to correlate with learning styles and participation in coursework (Du & Simpson, 2002), indicating that there may be some correlation with learning preferences when a participation measure is added to the analysis.

Gender correlation with learning style preferences has been studied using students in higher education settings. Demirbas and Demirkan (2007) found that design students tended towards assimilating and converging learning styles, but there was no significance regarding learning style preferences when sorted by gender. Brew's (2002) study in Australia noted that the LSI showed gender-

based sensitivity in the results, with female first-year university student participant results aligning with Kolb's theory, while male counterpart results featured construct validity issues.

Researchers have been critical of Kolb's LSI instrument and the assignment of learning styles. deCiantis and Kirton (1996) analyzed ELT results using Honey and Mumford's Learning Style Questionnaire (LSQ), concluding that no instrument at that time could identify all of Kolb's constructs. However studies have been conducted more recently continuing to look for correlations. Martin (2010) compared the outcomes of Kolb's LSI-2 instrument and the LSQ instrument in assigning learning styles to students at the university level in England. Previous analysis through other researchers showed that the LSQ did not prove to be a quality alternative measurement tool in comparison to the LSI (Duff & Duffy, 2002). Citing issues with correlation values, the validity of both instruments was questioned as there was some agreement between the outcomes of the two instruments, but not enough to be considered significant (Martin, 2010).

Platsidou and Metallidou (2009) compared the LSI and Felder and Soloman's (1999) Index of Learning Styles (ILS) measure in Greece. After analyzing the reliability and validity of both measures using the 340 participant sample size, the LSI showed acceptable reliability levels as opposed to the ILS instrument, but both showed weaknesses in psychometric measures (Platsidou &

Metallidou, 2009). The authors concluded that these tools were best used for self-development rather than for student grouping (Platsidou & Metallidou, 2009).

Noting similar psychometric limitations, Duff (2004) compared the LSI to the Problem Solving Style Questionnaire (PSSQ) developed by Romero, Tepper, and Tetrault (1993). The PSSQ measures the same learning style dimensions as identified and used by Kolb (1984) and had been considered a more reliable instrument, however Duff's (2004) research in the UK were not able to generate acceptable internal consistency values even though the values were an improvement over the LSI values.

Also critical of Kolb's LSI, Manolis, Burns, Assudani, and Chinta (2013) altered the LSI itself from a categorical measuring instrument producing a type of learning style to a continuous measure instrument looking a the degree of learning style within the participant. As part of this process, the RLSI was produced, a reduced instrument featuring 17 items as opposed to the original 48 item LSI (Manolis et al., 2013). The continuous scale results of the RLSI reflects Kolb's (1984) own notion that individual learn through all four modes even though his LSI labels individuals under one learning style mode.

Kolb's initial research and further development for the LSI included an analysis of behavior patterns of each learning style through various lenses (A. Y. Kolb & Kolb, 2005; D. A. Kolb, 1984; McCarthy, 2010). Two of these lenses, professional career and current job role, tie directly into traits associated with educators. Elementary level educators were generally found to have an

orientation towards active experimentation and a high orientation toward concrete experience, placing individuals in this profession in the Accomodator learning style (D. A. Kolb, 1984). This leads to questions regarding the preferred learning styles of higher education students entering into education related majors, which have gone unstudied for the most part.

Research studies connecting learning styles to K-12 teachers are limited. Studies in Europe have been conducted using the LSI with primary level teachers attempting to identify dominant learning styles of teachers (Koçakoğlu, 2010) or to test for reliability and validity of instruments (Platsidou & Metallidou, 2009), but most studies making the connection between K-12 teachers and learning styles uses students in university level teacher training programs as the sample group. Pre-service teacher studies use the LSI to determine preferences for learning or categorizing participants into groups using the LSI labels (Cavas, 2010).

Peterson (1985) used ELT as the basis for discussing experiential learning within the principal role. Principals, similarly to teachers and higher education students, develop many of their professional skills while working within the role. Peterson (1985) identifies that principals view their work as part of their learning process, however structures within schooling organizations and requires tasks of principals make experiential learning as defined by Kolb (1984) difficult. Peterson (1985) suggests that tasks and responsibilities of the principal can be made more efficient and effective through improving administrator understanding of experiential learning as part of improving their on-the-job learning processes.

Peterson's (1985) deductions can be align with connections between the school site application of ELT and PLC traits, such as collaboration and active experimentation of strategy usage, which would place importance not only in administrators understanding their own experiential learning, but that of their teaching staff.

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Connecting learning styles and learning preferences has led to various results in empirical research studies. Loo (2004) attempted to correlate learning styles identified using the LSI and a learning preference. Similar to other studies, Loo (2004) was able to establish limited statistical significance in linking the two concepts. Enjoyment in learning seems to correlate with learning styles and participation in coursework (Du & Simpson, 2002), indicating that there may be some correlation with learning preferences when a participation measure is added to the analysis. Researchers have used these connections to discuss and analyze ELT, learning styles, and Kolb's LSI use as it applies to adult learners.

Kruzich, Friesen, and Van Soest (1986) used the LSI to assess the preferred learning styles of students in two different university programs, developing a connection between learning styles and instructional preference. The outcomes suggest that varying the styles of instruction and learning experiences will produce positive outcomes for a collective group, as individuals within a classroom are likely to have different learning styles and learning preferences (Kruzich et al., 1986). Similar research has occurred within geography (Healey & Jenkins, 2000) and engineering (Hargrove, Wheatland, Duowen Ding, & Brown, 2008). Learning style preference research has attempted to connect with learning habits as well, with the study by Gogus and Gunes (2011) indicating that successful learning habits support student success as well as aligned learning styles.

Learning styles determined through the use of the LSI have been examined for use in higher education throughout research, looking at learning styles as a basis for developing instruction (McCarthy, 2010; Simpson & Du Yunfei, 2004). Kolb (1984) ties experiential learning theory to the higher education setting as well as organizational development in his work. Classroom assignments (Stokes-Eley, 2007), higher education class formats (Abdulwahed & Nagy, 2009; McCarthy, 2010), and teacher and student approaches to collaboration and instruction (Lin, 2011; Rosenfeld & Rosenfeld, 2006) have been part of research involving ELT. The consistency of instruction as well as learning traits, such as cognitive spontaneity, have also been connected to

specific learning styles with varying results (Bozionelos, 1996; McNeal & Dwyer, 1999).

Connections between grade achievement and learning style have been analyzed within engineering majors (Hargrove et al., 2008). In this study, assimilators appeared to be the largest student group within the students studied, however the grades earned varied between majors, leading to deductions that some majors within the engineering field support certain learning styles (Hargrove et al., 2008).

Kolb has participated in additional research regarding how learning styles work in conjunction with other theories of learning to add complexity and depth to student work (Joy & Kolb, 2009; Alice Y. Kolb & Kolb, 2010; A. Y. Kolb & Kolb, 2005; Mainemelis et al., 2002). For instance, use extensions of learning styles including discussions regarding learning spaces, connecting the physical environment with individual learning styles both in higher education environments (A. Y. Kolb & Kolb, 2005) and through more free-flowing ludic learning spaces (Alice Y. Kolb & Kolb, 2010).

Team Dynamics

A nexus between learning style preferences and PLC structures centers around interaction between team members and team dynamics. Experiential Learning Theory centers on learning created through interaction and the process involved (A. Y. Kolb & Kolb, 2005; D. A. Kolb, 1984), while PLC structures focus

on team collaboration connected to changes in instructional practice and definitive student outcomes on assessment measures (DuFour et al., 2008, 2004; DuFour & Eaker, 1998; DuFour & Marzano, 2011). Connections between school cultural elements, team collaboration methods, and the processes of professional learning has become a component of the professional literature as part of collaboration between Dufour and other researchers of school practices (DuFour & Fullan, 2013; DuFour & Marzano, 2011). Interaction between team members should be a focal point in building leadership capacity within teachers (DuFour & Fullan, 2013), while continuing to use the strengths of team members in meeting outcomes. Conceptually, the use of team member strengths would benefit from determining individual strengths through the use of an instrument designed to show individual preferences, such as Kolb's LSI.

Conversation is the driving force of collaboration within PLC systems. Teachers meet to develop instructional strategies and analyze data to increase student performance on accountability measures, driven by targeted and focused conversation surrounding the areas being developed by the team. Experiential Learning Theory has been connected to conversational learning, focusing on participants use of conversational space and specific differences in participant learning style preferences (Baker, Jensen, & Kolb, 2005). Baker, Jensen, and Kolb (2005, p.425) refer to understanding as "an ongoing inquiry of mutual participation among diverse perspectives." This connection aligns with the

function of PLC structures in that teacher collaborative sessions require discussion through lenses as a learning structure.

Heterogeneous groupings of teachers would assist in providing diverse perspectives due to the representation of different experiences and learning styles. Bowers, Pharmer, and Salas (2000) conducted a quantitative merging of thirteen studies and 57 hypothesis tests regarding effectiveness of homogenously constructed groups as compared to heterogeneously constructed groups. The findings differed due to the complexity of the task that the group needed complete. Homogeneous groups were determined to be more effective with tasks that are well-defined, required little data integration, and required simple responses (Bowers et al., 2000). Heterogeneous groups were found to be more effective at complex asks, limited information, and generating a wider range of options and approaches (Bowers et al., 2000). PLC work requires complex thinking dealing with student achievement data, developing instructional strategies, creating targeted student interventions, and monitoring student progress. This would suggest that heterogeneous team designs would be more beneficial for teacher teams.

Additional factors are present to insure productive groups. Molleman and Slomp (2006) note that although small group sizes can lead to interdependence of members, there must be enough members and viewpoints to have the group benefit from a diversity of skills. Factors such as team autonomy, compositional attributes, and stability also play a part in successful team construction

(Molleman & Slomp, 2006). As part of developing PLC teams, administrators must identify traits of their teams to increase effectiveness. Additional factors, such as learning style, may impact group effectiveness as well.

Greenlee and Karanxha (Greenlee & Karanxha, 2010) analyzed group dynamics of students in both cohort and non-cohort groups. Through survey research, they concluded collaboration within cohorts was significantly beneficial as it applies to satisfaction, cohesiveness, and trust (Greenlee & Karanxha, 2010). Cohort structure did not affect other surveyed areas as significantly, however every area analyzed showed higher ratings in collaborative subsystems than non-cohort structures suggesting that team dynamics are beneficial overall to collaborative processes (Greenlee & Karanxha, 2010).

Shared leadership is a focal point of collaborative structures such as PLCs. Hallinger and Heck (2010) looked for connections between collaborative leadership and school improvement through reading achievement. Similar to the improvement goals as a rationale for building PLCs (DuFour & Eaker, 1998; DuFour & Fullan, 2013; DuFour & Marzano, 2011), this study provided evidence that building collaborative leadership improved academic capacity within schools which showed improvement in student learning (Hallinger & Heck, 2010). Noted increases in collaborative leadership indirectly affected improvement in academic performance over time by building collective capacity at the school site (Hallinger & Heck, 2010).

Turesky and Gallagher (2011) combined leadership and Kolb's (1984) Experiential Learning Theory as it applies to coaching individuals in leadership positions. The authors identified a connection in understanding the preferred learning style of the leader and determined that adjusting coaching approaches to benefit those styles as important to continue development of leaders.

Positive interpersonal relationships assist in developing positive team structures as well. Whether working in groups and developing steps for collaborative practice (Frey, Lohmeier, Lee, & Tollefson, 2006) or looking at co-teaching partner pairs (Devlin-Scherer & Sardone, 2013), a common thread between findings are the effects of positive interaction leading to increased team output results.

Curşeu, Janssen, and Raab (2012) researched the conflicts that occur within collaborative learning groups. The researchers utilized established connections between task and relationship conflicts and correlated those findings with cognitive complexity. In addition, the team extended their hypotheses to include the network density of the group as well as the network structures in which team operate (Curseu et al., 2012; Curşeu & Schruijer, 2010). Path analysis was used to trace the relationships between task conflict, relationship conflict, network density, network structure, and cognitive complexity. Findings show that clique development along with other relationship conflicts impact task conflict and limit cognitive complexity (Curseu et al., 2012). This stresses the

importance of the implementation of systemic collaborative structures that incorporate compatible team members.

Summary

ELT, preferred learning styles, and the LSI have been used in a variety of higher education settings. Although their use in education majors has limited empirical research available, applications for the use of learning styles and ELT within higher education course design can be used by educators as part of professional development structures and improved understanding of the learning styles of teachers.

Researchers seeking connections between higher education structures and teacher development practices may look to use ELT as a structure for identifying tendencies in teacher interaction and approach to professional learning. As research begins to identify professional development structures and formats that best align with learning styles, transitions into using new systems of instruction and changes in implementation expectations, such as those associated with the current transition to Common Core State Standards, can be supported by administrators and trainers through the designed formats of development sessions.

CHAPTER THREE

METHODOLOGY

Introduction

The objectives of this study were to determine possible correlations between self-identified learning preferences and teacher perception of effective collaborative practices using the Professional Learning Community (PLC) model. PLC structures are a common structure used within public elementary school settings to assist teachers with collaboratively planning instruction to meet state and federal accountability targets. These collaborative structures continue to be of importance in the continuing transition towards Common Core State Standards implementation and in addressing student needs for success within the subsequent changes in accountability measure structures (i.e. Smarter Balanced Assessment Consortium assessments). Chapter Three outlines the methodology used within this research study. Sections within this chapter include: research questions and hypotheses, research design, population sample, instrumentation, variables, data collection procedures, data analysis procedures, and limitations.

Research Questions and Hypotheses

The primary research question developed for this study as part of exploring possible correlations between self-identified learning preferences and ratings of PLC effectiveness was:

- How do teacher perceptions of the effectiveness of the implementation and work within Professional Learning Community structures and strategies align with self-identified learning preferences?

As part of developing this research question, sub-questions were developed to further examine the primary objective. These sub-questions were:

- How do teachers within structured collaboration systems, such as PLCs, perceive their learning process?
- Do strong indications of teacher learning relate to strong ratings of PLC structures?

The hypothesis for this study was based on the traits of learning styles as defined by Experiential Learning Theory (Kolb, 1984) and features of PLC structures.

- Teacher-identified preferences of PLC structural component effectiveness will significantly correlate with self-identified teacher learning preferences.

A null hypothesis was developed along with the stated alternate hypothesis. The null hypothesis for the study was:

- There will be no correlation between PLC structural component effectiveness ratings and any self-identified teacher learning preference.

Research Design

This study used mixed methods as part of the overall research design. A cross-sectional design was used for this quantitative portion of this study. As

PLCs are a relatively recent structure within K-12 education, professional development and implementation in the area continue to evolve. As participants evaluated and identified their perceived strengths within PLC structures, they used a lens that was appropriate given their contextual background and current working environment. Differences in perceptions arose due to participant experiences within the teaching profession and within their tenure at their assigned school site. Therefore, the data and analysis within this study acted as a snapshot of a small cross-section of the overall group of teachers within PLC structures. Conclusions may not extend beyond the sample group due to the fluid nature of PLC development at the various sites (Krathwohl, 2009).

Similarly, the participant process allowing for self-identification of learning style presented a style that each participant related with at the time of the study. Since learning styles are developed through interaction with environmental factors (D. A. Kolb, 1984), changes in environmental conditions may change the learning style selected by participants through the use of the instrument. This created a similar time and environment contingent scenario, as learning styles are fluid based on the needs of the learner. Thus, a cross-sectional design was again appropriate given the time-sensitive nature of the learning style identification process (Krathwohl, 2009).

In order to further understand the participants' learning within PLC structures, a qualitative component was developed to supplement the quantitative data. The items allowed for improved understanding of the personal

experiences of teachers within the participant group, allowing for individual perspectives developed through common professional practice experiences to be captured. This segment is described further in the Instrumentation section of Chapter Three.

Population Sample

Active elementary school teachers operating within the Professional Learning Community (PLC) collaborative structure were needed in order to ensure that all participants had actively experienced similar collaborative practices. Participants were recruited from the current pool of employed elementary school teachers within a public school district located within southern California. The school district selected has prioritized PLC structures within the organization for approximately ten years. The target participant group consisted of a range of experience levels within the elementary teaching field.

Recruitment and Data Collection Methods

Participants were recruited through the use of an email containing a recruitment letter and a link to participate in the study. The email was sent to the potential participants' district-provided email addresses, supplied through an agreement with district officials. All district-level processes regarding approval of research were met with full compliance prior to the distribution of any materials.

Minimal demographic and experiential information was needed for this study. Participants were asked to indicate their gender, race or ethnicity, and years experience within the teaching field, school site, and current PLC team, which was determined by grade level or department assignment. This information was used as part of the descriptive analysis. Permission to use the internal district email system for distribution of the materials for the study along with the link to the online survey allowed for mass distribution of all relevant information for the study without specific email addresses used, further protecting the possible participants.

Participants used the email-supplied link to access the online survey. The link was not specific to email addresses, and therefore could not be used to determine which participant provided survey responses. Identities of participants were concealed in all reporting, with participants being assigned an identification number based on the order of survey submission. The survey information and links were distributed four times during the survey window to encourage participation, with the survey system entry time-stamping feature used to ensure that the collected data was submitted within the data collection period.

Instrumentation

Three instruments were used as part of the overall participant survey. Following entry of demographic information, participants responded to items to self-identify facets of their learning preferences. As part of developing ELT, Kolb

(1984) developed the LSI as a tool for learning style identification. The original 48-item version has been revised over time, increasing in both number of items and depth of analysis. Manolis, Burns, Assudani, and Chinta (2013) developed the Reduced Learning Styles Inventory (RLSI) to act as a continuous measure instrument, creating a simplified tool that could be administered more efficiently.

An instrument for determining learning preferences was developed specifically for this study, with similar intent to that which led to the RLSI (Manolis et al., 2013). The survey for this study consisted of twenty statements aligned to the two dimensions outlined by Kolb (1984). Using the descriptions of the traits and preferences of each end of the AC-CE and AE-RO continuums outlined by Kolb (1984), five statements were created aligned to the polarities of each continuum. Participants used a five-point Likert scale to indicate how accurately the statement reflected their own learning preferences. The survey was piloted with a small sample group, distributing the participants across continuums as designed. Feedback was gathered from the participants in the pilot sample group regarding the readability of the items, terminology used, and the structure of the survey. The feedback was used to make adjustments to the instrument prior to implementation for this study.

The second segment targeted teacher perceptions of effectiveness within PLC structures. The *Critical Issues for Team Consideration* survey was published by DuFour, DuFour, Eaker, and Many (2006) as a tool for teams to rate their effectiveness and implementation of PLC components within their team.

The instrument featured 18 items; each scored using a ten-point Likert scale. In the design of the instrument, a score of 1 was identified as low and a score of 10 was identified as the highest ranking. Although this was a practitioner-level instrument and therefore not been backed by empirical research, the survey was a professional tool designed by the creators of PLCs for participant self-evaluation (DuFour et al., 2006). This aligns well with identifying teacher perception of effectiveness, given that the rating system was easily accessible and the items are worded in a similar way to the guiding literature on PLCs, as the instrument has appeared in multiple PLC centered publications (DuFour et al., 2008, 2004, 2010, 2006; DuFour & Eaker, 1998).

A qualitative segment was created for further descriptive data collection. Participants were asked to briefly respond to five items, typing their narrative responses into the appropriate fields. The items required reflections on the connection between the on-going collaborative practices using PLC structures as prioritized by the participants and their own learning. Participants were able to determine the length of their responses to these items, with no limit set for the response length within the survey collection system. This method was selected primarily to capture the participants' descriptions in their own words, with no transcription needed by the researcher.

Variables

For the correlation analysis, two sets of variables were used. PLC survey item scores were clustered, with the cluster scores used as criterion data for the analysis. ELT item scores were calculated and used to create cluster scores used a predictor variables within the correlation table. All other data collected was used for descriptive analysis and frequency reporting.

Data Analysis Procedures

Data analysis was completed using mixed methods. Demographic and experience level data were used for population sample descriptive analyses. Descriptive analyses and frequency tables were generated for both the 20 ELT survey items and 18 PLC survey items to assess the item score outcomes and instrumentation. ELT item ratings were calculated to create cluster scores for each of four learning preferences per the deisng of the instrument. PLC item ratings were clustered using a qualitiative coding system with item text. PLC survey item clusters were created based on themes from the item coding indicating the PLC structural component common within these items. This coding and clustering process created seven PLC cluster scores, and the cluster scores were used with ELT cluster scores in a Pearson's product-moment correlation analysis to determine possible connections between the PLC clusters and ELT learning preferences. The Statistical Package for the Social Sciences

(SPSS, version 22) was used to generate descriptive and correlation analyses. Hypothesis testing was conducted using the results of the correlation analysis.

ELT cluster scores were calculated together with the corresponding continuum cluster to determine participant groupings wihtin the two learning dimension continuums for the purposes of the qualitative analyses. Qualitative analyses were conducted using the data acquired through the text entry survey section, consisting of one selected response item and five text-entry items. Participants typed their responses directly into the survey, eliminating the need for transcription of the qualitative responses. Submitted typed responses were coded and analyzed for themes related to groups established within the ELT cluster score process. Response frequency tables were reported using coded themes and ELT learning preferences based on the quantitative calculation results. Descriptive qualitative analysis was developed and reported.

Summary

This study followed a mixed methods approach. Descriptive and correlation analyses were used for the ELT and PLC surveys to determine possible connections between the two variables. The ELT learning preference groups were reported through frequency tables, with coded qualitative responses reported similarly. Results are reported within Chapter Four.

CHAPTER FOUR

RESULTS

Introduction

The purpose of this study was to examine connections or correlations between teacher preferences in learning and their participation in collaborative structures using the Professional Learning Community (PLC) model. PLC structures are common within the Kindergarten through grade 12 public school district setting as a response to meeting state and federal achievement markers per ESEA reauthorizations over the last fifteen years. Participants were recruited from a public school district that has prioritized PLC practices for approximately ten years. Participants completed a survey consisting of three main segments. Participants responded to items to self-identify learning preferences, rated their PLC team's effectiveness in meeting characteristics of effective PLC practices, and completed brief narratives of their learning within PLC structures. Minimal demographic information was collected.

Multiple research questions were investigated as part of this study. Targeted research questions were:

> Research Question 1: How do teacher perceptions of the effectiveness of the implementation and work within Professional Learning Community structures and strategies align with self-identified learning preferences?

Research Question 2: How do teachers within structured collaboration systems, such as PLCs, perceive their learning process?

Research Question 3: Do strong indications of teacher learning relate to strong ratings of PLC structures?

In conjunction with these research questions, a hypothesis was developed for the quantitative segments of the study. The hypothesis for the study was:

- Teacher-identified strengths of PLC structural component effectiveness will significantly correlate with self-identified teacher learning preferences.

The corresponding null hypothesis was:

- There will be no correlation between PLC structural component effectiveness ratings and any self-identified teacher learning preference.

Chapter Four describes the demographics of the participant population and analyses of the results of both the quantitative and qualitative data collected.

Sample Demographics

The target participant group consisted of elementary teachers who participate regularly in PLC structures within their professional setting. All of the participants within the final sample group work within the same public school district in southern California. The district has prioritized PLC structures for approximately ten years, ensuring that the participants met the participant criteria of familiarity and experience within the structures and systems associated with PLCs.

115 elementary school teachers completed the multi-section online survey, acknowledging their consent to participate on the initial landing page for the survey. 94 (81.7%) participants were female and 21 (18.3%) were male. Table 1 summarizes the demographics of the whole sample population.

Table 1

Participant Demographics

Characteristic	Frequency	Percent
Gender		
Male	21	18.3
Female	94	81.7
Race/Ethnicity		
African American / Black	3	2.6
Native American	1	< 1
Asian / Pacific Islander	2	1.7
Hispanic	21	18.3
White	83	72.2
Other	5	4.3

Note: N = 115

The descriptive statistics for the sample population indicated that 83 (72.2%) participants indicated their race or ethnicity as White, with 21 (18.3%) participants reported as Hispanic. All other races and/or ethnicities were indicated by five participants or less.

Participants were requested to note their experience levels within education at the outset of the survey. The participant group represented a variety of experience in the education field, with 14 (12.2%) participants have

worked in the field for two years or less, 14 (12.2%) taught for three to five years, 19 (16.5%) taught for six to ten years, 20 (17.4%) taught eleven to fifteen years, 22 (19.1%) teaching sixteen to twenty years, and 26 (22.6%) having taught more than 20 years.

Table 2 summarizes the teaching experiences of the participant group overall in education, within the participating school district, at the current site, and within the current grade level or department team. Data is presented in both response frequency and percentage of the total participant population.

Participant experience data indicated that 56 (48.7%) participants had been a member on their current PLC team for two years or less, with 24 (20.9%) having been on their current team for three to five years. This data was similar to participant time at their current site, where 49 (42.6%) participants have been at their site for two years or less and 18 (15.7%) for three to five years. Experience data was more evenly distributed regarding years within the school district, indicating that although teachers have not been with their team or at their site for longer timeframes, the majority of participants (74.8%) have been in the district for more than two years and therefore have participated in PLC structures for many years. The experience data reflected in Table 2 regarding the number of years at the current school site appears consistent with teacher transitions during the period prior to the study coinciding with the economic recession of 2008.

Table 2

Participant Experience

Characteristic	Frequency	Percent
Years in Education		
2 Years or Less	14	12.2
3-5 Years	14	12.2
6-10 Years	19	16.5
11-15 Years	20	17.4
16-20 Years	22	19.1
More than 20 Years	26	22.6
Years in School District		
2 Years or Less	29	25.2
3-5 Years	13	11.3
6-10 Years	21	18.3
11-15 Years	19	16.5
16-20 Years	16	13.9
More than 20 Years	17	14.8
Years at Site		
2 Years or Less	49	42.6
3-5 Years	18	15.7
6-10 Years	21	18.3
11-15 Years	11	9.6
16-20 Years	9	7.8
More than 20 Years	7	6.1
Years on Grade Level or Department Team		
2 Years or Less	56	48.7
3-5 Years	24	20.9
6-10 Years	16	13.9
11-15 Years	8	7.0
16-20 Years	6	5.2
More than 20 Years	5	4.3

Note: N = 115

Learning Preference Descriptive Results

Participants responded to twenty items related to their learning preferences. Each item was developed in connection with one of four learning preferences, represented along two learning dimension continuums by Kolb's (1984) Experiential Learning Theory (ELT) (see Figure 1). Participants responded to each item using a five-point Likert scale, indicating their agreement with how the given statement applied to their own learning preferences (see Appendix A). Items scored with a one indicated that the statement was "Not Preferred." Items scored with a five indicated that the statement was "Highly Preferred." Each of the four learning preferences was associated with five items, with scores summed to generate a learning preference score for each item cluster. Table 3 summarizes the descriptive statistics for learning preference items and cluster scores.

Learning preference items were noted as indicating one of the following dimensions: Concrete Experience (CE), Abstract Conceptualization (AC), Active Experimentation (AE), and Reflective Observation (RO) (Kolb, 1984). The AE cluster had the highest mean (M) score (21.10) with the lowest standard deviation value (SD) (2.69) of the four preferences, indicating participant responses to these items were consistently highly rated as compared to items from other preferences. The CE (M = 18.88, SD = 3.33), RO (M = 18.53, SD = 3.12), and AC (M = 18.27, SD = 3.31) cluster responses resulted in similar mean scores and standard deviation values.

Table 3

Learning Preference Cluster and Item Descriptive Statistics

Learning Preference Cluster	Maximum	Minimum	Mean	Standard Deviation
AC Item Cluster	*25*	*10*	*18.27*	*3.31*
ELT Item 2	5	2	3.86	.92
ELT Item 7	5	2	3.80	.99
ELT Item 10	5	1	3.19	1.05
ELT Item 15	5	2	3.73	.96
ELT Item 18	5	1	3.69	.97
CE Item Cluster	*25*	*11*	*18.88*	*3.33*
ELT Item 1	5	2	4.07	.84
ELT Item 8	5	1	3.54	1.14
ELT Item 9	5	2	3.78	.98
ELT Item 16	5	1	3.87	1.01
ELT Item 17	5	1	3.53	1.25
AE Item Cluster	*25*	*12*	*21.10*	*2.69*
ELT Item 4	5	2	4.02	.89
ELT Item 5	5	2	4.60	.62
ELT Item 12	5	2	3.97	.94
ELT Item 13	5	2	4.13	.77
ELT Item 20	5	2	4.39	.78
RO Item Cluster	*25*	*13*	*18.53*	*3.12*
ELT Item 3	5	2	4.17	.95
ELT Item 6	5	1	3.63	1.05
ELT Item 11	5	1	3.89	.85
ELT Item 14	5	1	3.17	.98
ELT Item 19	5	1	3.77	.97

Note: N = 115

CE items and AC items were calculated together to place the participant on the AC-CE continuum. AC cluster total scores were subtracted from the total CE score, with resulting positive values indicating a CE preference and negative

values representing an AC preference. Similarly, AE cluster scores and RO cluster scores were calculated together to place participants on the AE-RO continuum. AE totals were subtracted from RO totals, with resulting positive values indicating an RO preference while negative values represented an AE preference. Equal values for both preferences on either continuum lead to a neutral score designation. Table 4 summarizes the frequency and percentage of participant placement on both the AC-CE and AE-RO continuums.

Table 4

Participant Learning Preferences by Continuum

Learning Preference by Continuum	Frequency	Percent
AC-CE Continuum		
Abstract Conceptualization Preference	42	36.5
Concrete Experience Preference	58	50.4
Neutral Preference	15	13.0
AE-RO Continuum		
Active Experimentation Preference	93	80.9
Reflective Observation Preference	9	7.8
Neutral Preference	13	11.3

Note: N = 115

The participant learning preferences by continuum frequency data indicates 15 (13.0%) participants produced a neutral score on the AC-CE continuum and 13 (11.3%) of participants produced a neutral score on the AE-RO continuum. A neutral score in a continuum indicates that these participants

are equally adept in both preferences related to the continuum. In both cases, the neutral scoring participants were analyzed as part of groups using the other continuum when possible due to the shown learning preference within the dimension.

The comparatively high mean scores and low standard deviation scores for the AE cluster items (see Table 3) are reflected in the frequency of participants being placed within the AE preference on the AE-RO continuum. The consistently higher scoring of these items by participants led to 93 (80.9%) being placed within the AE preference, as compared to the 9 (7.8%) participants within the RO preference or the 13 (11.3%) participants who scored neutrally.

Kolb (1984) used the ratings from the LSI to place the scores of both continuums onto a coordinate plan to determine the learning style of participants (see Figure 1). Similarly, participant scores in this study were combined to suggest placement on a coordinate plane. Although the survey items are not intended to identify the learning styles developed by Kolb (1984), preference suggestion based on the calculated continuum scores was used to determine possible preference combinations across both continuums. Participants with a neutral score on one continuum were labeled with only the preference from the other continuum (i.e. a label of “AE” as opposed to a “AE/CE” label). Participants scoring neutral on both continuums were noted as such. Table 5 summarizes the continuum score combination frequencies and percentages.

Table 5

Participant Learning Preference Across Continuums

Learning Preference Across Continuums	Frequency	Percent
Active Experimentation / Concrete Experience	49	42.6
Reflective Observation / Concrete Experience	5	4.3
Active Experimentation / Abstract Conceptualization	34	29.6
Reflective Observation / Abstract Conceptualization	3	2.6
Abstract Conceptualization Only	5	4.3
Concrete Experience Only	4	3.5
Active Experimentation Only	10	8.7
Reflective Observation Only	1	< 1
Both Continuums Scoring Neutral	4	3.5

Note: N = 115

Kolb (1984) noted that elementary educators most commonly fell within the Accomodator learning style (p.89), showing a high preference for Concrete Experience along with a tendency to prefer Active Experimentation (see Figure 1). As part of analyzing the ELT portion of the instrument, participant continuum scores were used to create coordinate pairs in order to determine whether the results of the instrument within this study aligned with Kolb's (1984) interpretations through the LSI. The distribution of participants appeared consistent with the placement of elementary teachers by Kolb (1984), as 49 (42.6%) participants scored with the AE/CE combination, representing the largest frequency within the participant group. This participant group also had comparative high frequency within the AE/AC combination, with 34 (29.6%) participants scoring with that combination.

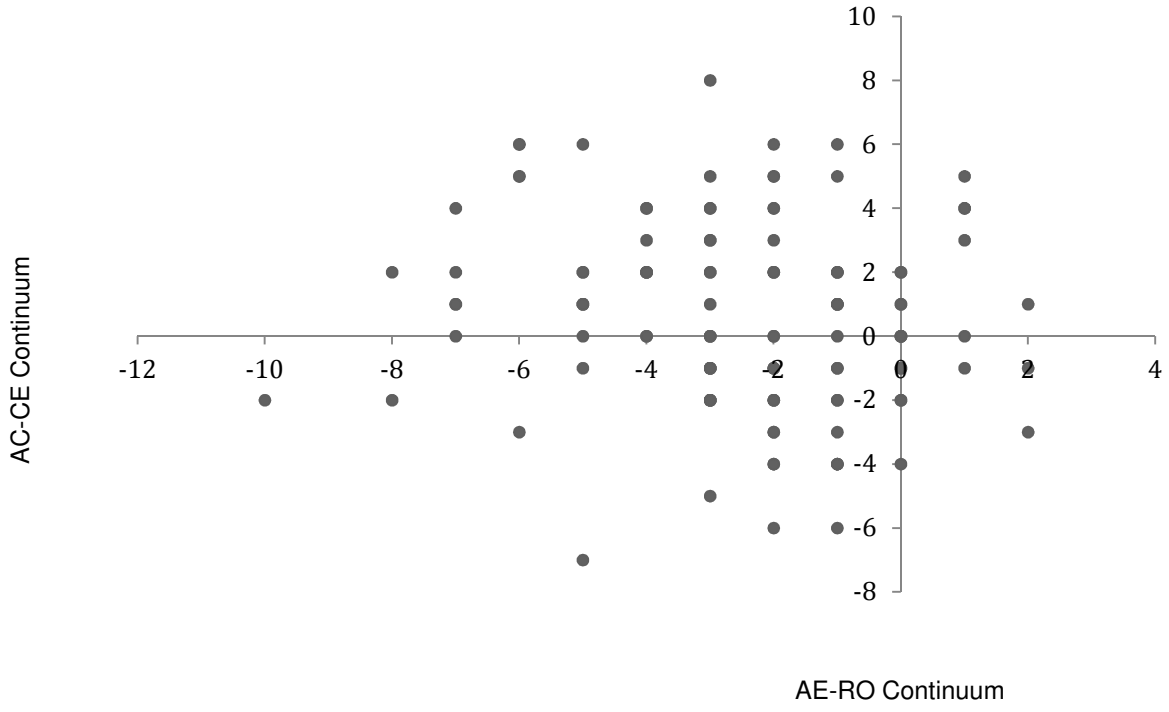


Figure 2
Scatterplot of Participant Continuum Values

Figure 2 summarizes the placement of participants on the ELT matrix using their calculated continuum scores. Distribution along the AC-CE continuum indicates a skewing towards the CE preference. 59 (50.4%) participants scored within the CE range, 42 (36.5%) participants scored within the AC range, and 15 (13.0%) participants scored neutrally on this continuum. The participant group showed significant skewing towards the AE preference, with 93 (80.9%) participants placing on the AE portions of the matrix. Participants indicated by points directly on either axis within the matrix are considered equally adept on the corresponding continuum.

Professional Learning Community Effectiveness Descriptive Analysis

Participants responded to 18 items from the *Critical Issues for Team Consideration* (DuFour et al., 2006) survey in order to determine participant perceptions on the effectiveness of PLC team actions within their current collaborative group (see Appendix B). Responses were made using a ten-point Likert scale, indicating the extent to which statements were true of participant PLC team practices. Responses of ranging between 1 and 3 indicated that the statement was "not true of our team." Responses between 4 and 7 indicated that participants felt that "our team is addressing this issue." Responses between 8 and 10 indicated participants viewed the statement as "true of our team." Table 6 summarizes the descriptive statistics from the PLC item responses.

PLC items were clustered based on the content of the items. As displayed in Table 6, seven cluster scores were developed through the summation of results within clustered items in the categories of team norming, SMART goal systems, student outcome criteria, curricular alignment, academic intervention, formative assessment, and summative assessment.

SMART goal setting and curricular alignment each included four items from the PLC survey, with the remaining four clusters each featuring two items. The SMART goal setting cluster and the curricular alignment cluster had maximum scores of 40. Mean scores and standard deviation scores for SMART goal setting ($M = 30.10$, $SD = 8.41$) and curricular alignment ($M = 30.30$, $SD =$

8.24) were comparable, which indicated that participant responses in these two areas were similarly rated with positive ratings.

Table 6

Professional Learning Community Item Cluster and Item Descriptive Statistics

PLC Item Cluster	Maximum	Minimum	Mean	Standard Deviation
Team Norming	*20*	*2*	*13.84*	*5.02*
PLC Item 1	10	1	7.84	2.58
PLC Item 18	10	1	6.00	3.08
SMART Goal Setting	*40*	*4*	*30.10*	*8.41*
PLC Item 2	10	1	7.28	2.69
PLC Item 3	10	1	7.66	2.40
PLC Item 7	10	1	7.43	2.46
PLC Item 14	10	1	7.74	2.31
Student Outcome Criteria	*20*	*2*	*15.03*	*4.21*
PLC Item 11	10	1	7.73	2.29
PLC Item 15	10	1	7.30	2.39
Curricular Alignment	*40*	*4*	*30.30*	*8.24*
PLC Item 4	10	1	8.37	1.97
PLC Item 5	10	1	7.41	2.35
PLC Item 6	10	1	7.17	2.66
PLC Item 12	10	1	7.37	2.52
Academic Intervention	*20*	*2*	*14.61*	*4.55*
PLC Item 9	10	1	7.14	2.41
PLC Item 13	10	1	7.47	2.43
Formative Assessment	*20*	*2*	*14.95*	*4.54*
PLC Item 8	10	1	7.17	2.60
PLC Item 10	10	1	7.78	2.38
Summative Assessment	*20*	*2*	*15.08*	*4.54*
PLC Item 16	10	1	7.48	2.44
PLC Item 17	10	1	7.60	2.34

Note: N = 115

The four clusters that featured two items each had maximum possible scores of 20. Team norming (M = 13.84, SD = 5.02) had the lowest mean score and highest standard deviation value, indicating participants had varied perceptions for these two items. The two PLC items within the team norming cluster had mean scores of 7.84 and 6.00, which indicated lower overall scores by participants when rating PLC Item 18 as compared to PLC Item 1. Academic intervention (M = 14.61, SD = 4.55), formative assessment (M = 14.61, SD = 4.55), student outcome criteria (M = 15.03, SD = 4.21), and summative assessment (M = 15.08, SD = 4.54) had comparable mean scores and standard deviation values indicating that these areas were perceived similarly by the participant group as a whole. The mean scores in academic intervention, formative assessment, and summative assessment indicated that participants scored these items with similarly high ratings as those in SMART goal setting and curricular alignment.

Correlation Analysis

Learning preference designations were entered into a correlation analysis with PLC item clusters to determine whether relationships could be established between the two sets of variables. Using the learning preference cluster scores and the PLC item cluster scores, a two-tailed Pearson's product-moment correlation was used to analyze the data. The preliminary analyses showed that the relationships between ELT cluster scores and PLC cluster scores were linear

(see Appendix C). Results are reported at both the 0.05 and 0.01 significance level. Table 7 summarizes the results of the correlation analysis.

Table 7

Correlation Table

PLC Item Cluster	AC	CE	AE	RO
Team Norming				
Pearson R^2	.107	.091	.105	.247**
Sig. (2-tailed)	.255	.332	.264	.008
SMART Goal Systems				
Pearson R^2	.118	.155	.122	.178
Sig. (2-tailed)	.210	.098	.193	.056
Student Outcome Criteria				
Pearson R^2	.308**	.270**	.246**	.331**
Sig. (2-tailed)	.001	.004	.008	.000
Curricular Alignment				
Pearson R^2	.174	.124	.166	.252**
Sig. (2-tailed)	.064	.188	.077	.007
Academic Intervention				
Pearson R^2	.286**	.248**	.253**	.286**
Sig. (2-tailed)	.002	.007	.006	.002
Formative Assessment				
Pearson R^2	.158	.136	.110	.169
Sig. (2-tailed)	.092	.149	.241	.071
Summative Assessment				
Pearson R^2	.274**	.182	.159	.196*
Sig. (2-tailed)	.003	.051	.090	.036

Note: N = 115; ** = statistically significant at *p < .01 level;* * = statistically significant at *p < .05 level*

Student outcome criteria and academic intervention were significant to the .01 level for all four learning preferences. RO (R^2 = .331, *sig*. = .000) participant responses had the strongest correlation to student outcome criteria, and both RO (R^2 = .286, *sig*. = .002) and AC (R^2 = .286, *sig*. = .002) participant data produced the strongest values within the academic intervention PLC item cluster results. The summative assessment item cluster was significant for the AC (R^2 = .274, *sig*. = .003) cluster scores and RO (R^2 = .196, *sig*. = .036) cluster scores at the 0.05 level.

Using learning preference as the primary focus, the RO cluster scores were significant with five PLC item clusters at the 0.05 level. In addition to the student outcome criteria, academic intervention, and summative assessment cluster correlations that have been described previously, RO cluster scores were significant at the 0.05 level with team norming (R^2 = .247, *sig*. = .008) and curricular alignment (R^2 = .252, *sig*. = .007). The AC cluster scores were significant at the 0.05 level with the summative assessment (R^2 = .274, *sig*. = .003) cluster in addition to the significant correlations with student outcome criteria and academic intervention previously described.

Using a continuum lens, the correlation values indicated stronger correlations with the AC preference participants in the AC-CE continuum due to the significant Pearson R^2 value in the summative assessment item cluster that was not shared with the CE preference group. The AE-RO continuum results indicated a larger discrepancy between the two preferences. RO scores

significantly correlated with five PLC item clusters while the AE cluster scores significantly correlated with only the two PLC item clusters shared by all four preferences.

Research Hypotheses

The research hypothesis for this study was, "Teacher-identified strengths of PLC structural component effectiveness will significantly correlate with self-identified teacher learning preferences." Based on the data supplied through the correlation analysis, the hypothesis was supported through twelve significant R^2 values when correlating PLC item clusters and learning preference cluster scores. With five of seven R^2 values proving significant at the 0.05 level, the RO cluster group indicated the most frequent correlation with PLC item clusters for the total participant group. AC cluster scores were significantly correlated with three PLC item cluster scores. This significance will be further explored within Chapter Five.

The null hypothesis used for this study was, "There will be no correlation between PLC structural component effectiveness ratings and any self-identified teacher learning preference." The null hypothesis was rejected due to correlations across 12 areas between PLC item clusters and teacher learning preferences.

Qualitative Item Results

The qualitative item set for this study consisted of six items. These items were intended to allow participants to further explain their experiences and learning within PLC structures. Following one selected response item, participants were able to enter their responses to five items via text boxes within the online survey, allowing for the participant to determine the length and detail of the responses. Responses to text entry items (Qualitative Items 2 through 6) were coded and clustered into themes.

All qualitative item results were reported using locations on the two learning dimension continuums. Each participant received a cluster score for the AC-CE continuum and the AE-RO continuum (see Table 4), designating a learning preference for each participant through the two specific learning dimensions. Of note was that the total pool of participants was used when analyzing the qualitative data through the AC-CE and AE-RO continuums. The purpose of using the continuum lenses was to determine differences between the associated learning preferences within the same dimension. Although comparisons may be made to the other continuum, the similarities and differences between the two learning preferences in each continuum was the focus. Descriptive interpretations were reported through the lens of each continuum as applied to the coded responses.

Qualitative Item 1

Participants began the qualitative section by responding to the question: "Do you feel that your professional learning has been supported by your collaborative practice within PLC structures?" Responses were recorded with either a "yes" or "no" selection in order to determine the overall perspective of their participation within PLCs. 100 (87.0%) participants responded "yes," indicating that their professional learning had been supported within PLC structures. 15 (13.0%) participants responded "no," indicating that they did not believe that their own learning had been supported through PLC processes. Table 8 describes the frequency of responses to Qualitative Item 1 and by learning preference as identified in Table 4.

Table 8

Qualitative Item 1 Response Frequency

Learning Preference Continuum and Preference	Yes	No
AC/CE Continuum		
AC	38	4
CE	50	8
Neutral	12	3
AE/RO Continuum		
AE	79	14
RO	9	0
Neutral	12	1

Note: N = 115

The 15 participants who replied “no” to Qualitative Item 1 are distributed across both of the learning preference within the AC-CE continuum, with the highest frequency within the Active Experimentation preference group. None of the RO participants responded with a “no” to Qualitative Item 1, indicating that the entire group of RO participants perceived that their experiences within PLCs had supported professional learning. The RO participant group was the only continuum subgroup with all “yes” responses.

Qualitative Item 2

Qualitative item 2 requested participants to respond to the prompt: “Please describe how your learning has been supported or how your learning has not been supported through PLC structures.” This item allowed participants to share their experience surrounding their own development through their work with others within structured collaboration. Participant responses were coded based on the primary rationale provided in the participant responses. Codes were combined into themes in order to further deduce common patterns amongst the responses. Table 9 summarizes the major themes and coding of participant responses for Qualitative Item 2.

Communication was the dominant theme for supporting teacher learning, with 41 (35.7%) participant comments aligning with topics related to communication within the team. Communication themes comments combined concepts of communicating with teammates, discussion within team meetings, and sharing ideas between team members. Collaboration was another key

theme, with 24 (20.8%) responses aligning with collaborative practices. Although 15 participants indicated in Qualitative Item 1 that PLC structures did not support their learning, 16 (13.9%) responses responded that some component of learning within PLCs was ineffective.

Table 9

Major Themes from Qualitative Item 2

Themes and Codes	Frequency	Percent
Collaborating	*24*	*20.8*
Collaboration	23	
Teach Teammates	1	
Communication	*41*	*35.7*
Communication	3	
Discussion	11	
Sharing	17	
Team	*6*	*5.2*
Support	1	
Time Together	4	
Connectedness	1	
Ineffective	*16*	*13.9*
Other	*28*	*24.3*

Note: N = 115

Themes were viewed in combination with learning preferences by continuum. Table 10 summarizes the frequency of participant responses within the themes shown in Table 9 using the AC-CE continuum as the basis for participant grouping.

Responses to Qualitative Item 2 were relatively evenly distributed when organized by the AC-CE continuum. CE participants more frequently indicated communication as supporting their learning within PLCs than their AC counterparts, with 17 CE participants noting this theme compared to 10 AC participants.

Table 10

Qualitative Item 2 Response Frequency for the AC-CE Continuum

Response Themes	AC	CE	Neutral
Collaborating	10	11	3
Communication	11	17	3
Team	4	10	2
Ineffective	4	10	2
Other	10	8	0

Note: N = 115

Responses from both AC and CE participants within the communication grouping indicated strong preferences for discussion with teammates. One AC participant noted, “I gain, by far, the most useful knowledge, that can immediately be implemented into the classroom, by working/talking/discussing with my co-workers” (Participant 88, March 2015). A CE participant noted, “It is always good to collaborate with others and utilize others’ strengths” (Participant 35, March 2015). These connections show a strong link between the collaborative structure built into PLCs and the need for strong communication within the team.

Table 11 summarizes the themes from Qualitative Item 2 with the AE-RO continuum. Communication was the most frequent response for the AE preference, with 24 participant comments coded into this theme. Regarding communication, an AE participant noted, “It is helpful to discuss what strategies are helpful and to get more ideas from others during a PLC” (Participant 16, March 2015). Collaboration was also frequently noted, with 18 participant responses coded into this category. Regarding collaboration, one AE participant noted, “We are able to learn from each other. We are better together than we are apart” (Participant 62, March 2015).

Table 11

Qualitative Item 2 Response Frequency for the AE-RO Continuum

Response Themes	AE	RO	Neutral
Collaborating	18	2	4
Communication	24	4	3
Team	15	0	1
Ineffective	15	1	0
Other	14	1	3

Note: N = 115

The RO participant group also supported communication as the most frequently indicated theme. One RO participant noted, “PLC’s are essential for our grade level. We learn and share ideas that have worked in the classroom. We also share ideas that have not worked in the classroom” (Participant 14,

March 2015). No RO participant response was coded as team oriented, the only such combination from any of the preference groups.

16 participants noted that PLC practices were ineffective in some way regarding supporting their professional learning. Some of these responses indicate ineffectiveness as applied to other coded themes. A participant falling in the CE and AE group noted:

> I do not think my team shared enough information with one another. We each seem to be doing our own thing, and comparing ideas or results now and then. I do think that each one of us is teaching to standards, but it would be better for us to be working more parallelly as a team (Participant 54, March 2015).

Clear connections were identified within this response to communication and collaboration being ineffective for this participant. Another ineffective themed response from a CE/AE participant was, “In only working with your specific team there is only so much you can teach each other. It would be great to collaborate with grade level teachers across the district” (Participant 29, March 2015).

Qualitative Item 3

Qualitative Item 3 requested participants to identify supportive practices. The item prompt read: “What portions of collaborative practice have been most supportive of your professional learning?” This item allowed participants to narrow the scope of their experiences and note specific practices that have been most supportive to them. This item acts as an extension of Qualitative Item 2,

probing for more specificity in the participant reply. Participant responses were coded and clustered into themes based on the focal practice within the response. Table 12 summarizes the frequency of codes and themes from the responses to Qualitative Item 3.

39 (33.9%) participants suggested that communication was a highly supportive structure in their development. Codes including discussion and sharing again appeared frequently for these responses. Planning was a theme with 26 (22.6%) participant responses, a concept that was not directly noted within Qualitative Item 2. Collaboration continued to be a strong theme, with 16 (13.9%) participant responses aligning with this theme.

Table 12

Major Themes from Qualitative Item 3

Themes and Codes	Frequency	Percent
Collaborating	*16*	*13.9*
Collaboration	14	
Brainstorming	2	
Communication	*39*	*33.9*
Discussion	17	
Sharing	22	
Team	*9*	*7.8*
Support	1	
Time Together	7	
Team Oriented	1	
Planning	*26*	*22.6*
Negative Responses	*4*	*3.5*
Other	*9*	*7.8*
No Response	*12*	*10.4*

Note: N = 115

When viewing the frequency of coded responses through the AC-CE continuum lens, similar frequency distributions occur as within Qualitative Item 2. The CE participant group again identified communication as a primary theme, with 24 CE participant responses falling into the theme. 12 AC participants also responded with communication-coded entries, making the theme the most frequently occurring for both groups. Table 13 summarizes the response themes by AC-CE continuum preference.

Table 13

Qualitative Item 3 Response Frequency for the AC-CE Continuum

Response Themes	AC	CE	Neutral
Collaborating	9	6	1
Communication	12	24	3
Team	5	4	0
Planning	10	13	3
Negative Response	0	2	2
Other	3	5	1
No Response	3	4	5

Note: N = 115

AC and CE participants have similar submissions for this item. One AC participant notes, “The discussion of different ways to present material and the building upon the ideas of others has been most supportive” (Participant 15, March 2015). A CE participant similarly noted, “Seeing my colleagues teaching styles and problem solving as a team” (Participant 80, March 2015). Both of

these responses speak to communication and collaboration in similar ways, however the AC respondent notes the more abstract “building upon the ideas of others” (Participant 15, March 2015) versus the CE member’s more experiential “problem solving as a team” (Participant 80, March 2015) notation.

The AE-RO continuum lens presented similarities between these two preferences. Both the AE and RO respondents noted communication as the primary structure of benefit. 33 AE participants and 4 RO participants indicated this theme as the most supportive. Both groups also frequently identified planning as a supportive structure, with 22 AE and 2 RO respondents indicating this theme within their responses. Table 14 summarizes the theme frequencies using the AE-RO participant grouping distribution.

Table 14

Qualitative Item 3 Response Frequency for the AE-RO Continuum

Response Themes	AE	RO	Neutral
Collaborating	13	0	3
Communication	33	4	2
Team	8	0	1
Planning	22	2	2
Negative Response	4	0	0
Other	5	1	3
No Response	8	2	2

Note: N = 115

RO participant responses differed from AE responses in the communication theme. RO participant responses within the communication theme all strongly noted sharing focused on student outcomes as part of communication, where as AE participants noted communication as part of group problem solving, exchanging ideas, or building on responses. Both response sets align with communication, but there was a clear differential between the active nature of the AE group and the reflective nature of the RO participants.

Not all comments might be interpreted as completely positive in nature. One AC/AE participant noted that the most supportive practice was, “Being forced to work together. I prefer to work alone, but benefit immensely from working with others” (Participant 101, March 2015). A CE/AE participant noted, “I appreciate the different perspectives that a team can bring. I also appreciate the challenge of defending my position, it really makes me analyze why I think the way I do and why I feel it is important” (Participant 37, March 2015). Both of these noted participants selected “yes” to Qualitative Item 1, indicating that they feel that PLCs support their professional learning overall.

Qualitative Item 4

Qualitative Item 4 asked participants to respond to: “What portions of collaborative practice have been least supportive of your professional learning?” This item counters the information collected in Qualitative Item 3, asking participants to identify the area in need of adjustment for their own benefit. Table 15 summarizes the theme frequency from Qualitative Item 4 results.

Table 15

Major Themes from Qualitative Item 4

Themes and Codes	Frequency	Percent
Assessment / Accountability	*17*	*14.7*
Accountability Tasks	10	
Assessment	6	
Timelines	1	
Personality Conflict	*20*	*17.4*
Disagreement	1	
Colleague Passivity	2	
Teammate Personalities	17	
Lack of Communication	*9*	*7.8*
Communication Issues	7	
Lack of Communicated Structure	2	
Time Usage	*27*	*23.5*
Lack of Time	16	
Time for Professional Development	9	
Time for Research	2	
Misalignment	*8*	*7.0*
General Structure / Self Oriented	*8*	*7.0*
No Reported Constraints	*3*	*2.6*
No Response	*23*	*20.0*

Note: N = 115

Time usage was the most frequent theme identified in the participant responses, with 27 (23.5%) responses indicating an issue around time availability. Personality conflict was also a frequent theme in the responses, with 20 (17.4%) responses contained within the theme. This item also featured the most number of non-responses of all the qualitative items. 23 (20.0%) participants did not enter a response for this item. Interpretations of this large

non-response rate could be that participants may not have chosen to disclose their thoughts, did not have an area that they felt needed improvement, or were not able to develop a response. Three participants reported that they found no structures that were least supportive to their professional learning.

The AC/CE continuum lens showed some differential between the two preferences as it applies to least supportive areas. Table 16 summarizes the theme frequency by preference within the AC-CE continuum. Both the AC and CE participant groups identified time usage as the most restrictive structure, with 11 AC participant responses and 15 CE participant responses falling within the primary theme. AC participants aligned personality conflict as the second most frequent structure of least support with 9 responses, while CE preference participants noted assessments and accountability tasks as the second most frequent area with 12 responses.

Table 16

Qualitative Item 4 Response Frequency for the AC-CE Continuum

Response Themes	AC	CE	Neutral
Assessment / Accountability	4	12	1
Personality Conflict	9	9	2
Lack of Communication	6	2	0
Time Usage	11	15	1
Misalignment	1	7	0
General Structure / Self Oriented	0	6	2
No Reported Constraints	2	0	1
No Response	9	7	7

Note: N = 115

Grouping participants along the AE-RO continuum indicates that AE preference participants identified areas similarly to the distribution when the participants are grouped along the AC-CE continuum. Table 17 summarizes the frequencies of each theme within the AE-RO continuum.

The AE preference group indicated time usage (33), personality conflict (16), and assessment and accountability tasks (15) as the top three structures that have been least supportive of professional learning. This aligned to the distributions within the AC-CE continuum. The RO preference participants differed in their response distribution. Although time usage was rated by two of the participants in the small group, misalignment issues were more frequently coded within their responses. The percentage of RO participants that chose to not respond to this item was higher than that of any other preference group, with 33.3% of RO preference participants choosing to opt out of this item.

Table 17

Qualitative Item 4 Response Frequency for the AE-RO Continuum

Response Themes	AE	RO	Neutral
Assessment / Accountability	15	1	1
Personality Conflict	16	0	4
Lack of Communication	9	0	0
Time Usage	33	2	3
Misalignment	4	3	1
General Structure / Self Oriented	8	0	0
No Reported Constraints	2	0	1
No Response	17	3	3

Note: N = 115

Qualitative Item 5

Qualitative Item 5 prompted participants to provide information with the prompt: “Please describe the element or structure of PLC collaboration that, in your opinion and experience, is most crucial to professional learning.” This item allowed participants to further digest the most important structure of PLC collaboration concepts from Qualitative Item 3 and consider the areas that were least supportive to their learning from Qualitative Item 4 to determine the most crucial element or structure for their own development. Responses to this item varied between technical structural responses and interpersonal relationship-based responses. The non-response rate decreased from 23 (20.0%) to 12 (10.4%) participants, possibly indicating that the group has stronger opinions when asked to respond to this item. This item also produced the highest response frequency from any of the qualitative items, with 46 (40.0%) participants identifying respect themed responses as most crucial to professional learning within PLC collaborative structures.

Table 18 summarizes the response frequencies for the themes from Qualitative Item 4 responses. Communication continued to be a frequent response through the qualitative items, with 18 (15.7%) participant responses coded with communication as the most crucial element. Themes of respect and communication could be tied together in this sample, as most of the respect-oriented responses contained elements tied to communication concepts. For example, one participant noted that the most crucial element for learning with

PLC structures was, “Open dialogue, respectful and supportive team members” (Participant 27, March 2015). Another similar response was, “Openness to and accepting of each other’s ideas” (Participant 39, March 2015).

Table 18

Major Themes from Qualitative Item 5

Themes and Codes	Frequency	Percent
Respect	*46*	*40.0*
Acknowledgement	1	
Respect	22	
Team Connection	17	
Togetherness	1	
Trust	5	
Assessment	*7*	*6.1*
Planning	*10*	*8.7*
Brainstorming	1	
Planning	8	
Preparedness	1	
Communication	*18*	*15.7*
Communication	2	
Sharing	16	
Development	*5*	*4.3*
Teacher Control of Topic	3	
Professional Development	2	
Time	*14*	*12.2*
Other	*3*	*2.6*
No Response	*12*	*10.4*

Note: N = 115

Table 19

Qualitative Item 5 Response Frequency for the AC-CE Continuum

Response Themes	AC	CE	Neutral
Respect	17	24	5
Assessment	3	3	1
Planning	2	5	3
Communication	4	12	2
Development	2	2	1
Time	7	7	0
Other	1	2	0
No Response	6	3	3

Note: N = 115

Table 19 summarizes the frequency of themes as grouped through the AC-CE preference lens. Respect was the primary theme of responses from both AC and CE preference participants. AC preference group responses indicated that time was the second most identified theme, with 7 responses coded in the group. CE preference participant responses more frequently indicated communication than time, with 12 responses coded within the communication theme and 7 responses coded within the time theme. The AC proclivity to processing information through a research and theory lens as opposed to the experiential focus of the CE preference may be one reason for this difference frequency.

Table 20

Qualitative Item 5 Response Frequency for the AE-RO Continuum

Response Themes	AE	RO	Neutral
Respect	39	3	4
Assessment	5	1	1
Planning	8	1	1
Communication	15	2	1
Development	3	0	2
Time	11	1	2
Other	3	0	0
No Response	9	1	2

Note: N = 115

When regrouping the population based on their placement within the AE-RO continuum, similar patters arise. Both the AE and RO preferences most frequently identify respect, communication, and time as the three most crucial aspects to learning within PLC structures. Planning was most frequently identified by the AE preference group as compared to the other preferences, possibly explained by the active planning process that was part of collaboration, which may connect with the AE preference tendency to learn material through directly working within the process. Only one RO group participant selected planning as most crucial. Table 20 summarizes the frequency of themes within Qualitative Item 5 as viewed through the AE-RO continuum lens.

Qualitative Item 6

The final item on the survey, Qualitative Item 6, requested participants to respond to the prompt: “Please briefly describe how your learning could be better

supported during collaborative practice." This item requested participants to share specific changes, suggestions for adjustment, or note areas that could be improved in supporting learning. Similar to Qualitative Item 4, this item allows participants to identify areas that are not supportive but extend those ideas into proposed solutions. Many responses indicated issues that had been identified in other qualitative items by the same participant. Responses to Qualitative Item 6 had connections to items named both for being most supportive, being least supportive, or being crucial to learning within PLC structures. Table 21 summarizes the response frequencies for all coded themes for Qualitative Item 6.

Time was indicated by 43 (37.3%) participants as how support for learning could be improved. The time theme featured responses aligned to different time-based needs. 11 responses indicated that the issue needing to be corrected regarding time was to use the available time more effectively, and another three participant responses noted a need for focus during time together. More time was the largest code group, with 28 participant responses within the code.

Improving collaboration structures and resources were also highly indicated. 20 (17.4%) responses fell within the theme of improved collaboration structures, with responses indicating that time collaborating with other teams and observing others as part of collaborative practice were needed. The 16 (13.9%) participant responses within the resources theme identified multiple types of resources within their responses. Coaching and training were two such

resources, while curricular options and material resources were also identified. 5 (4.3%) participants indicated that they would not make any changes.

Table 21

Major Themes from Qualitative Item 6

Themes and Codes	Frequency	Percent
Time	*43*	*37.3*
Differentiated Time Use	1	
Effective Use of Time	11	
Focus	3	
More Time	28	
Resources	*16*	*13.9*
Coaching	7	
Resources	7	
Support	2	
Improved Collaboration Structures	*20*	*17.4*
Cross-Team Collaboration	12	
Observation	7	
Planning	1	
Structural Changes	*6*	*5.2*
Communication	*4*	*3.5*
Other	*4*	*3.5*
No Changes Needed	*5*	*4.3*
No Responses	*17*	*14.8*

Note: N = 115

Using the AC-CE continuum to group participants, the responses again fell most frequently into the time, resources, and improved collaboration structures

themes for both the AC and CE preference groups. Table 22 summarizes the frequencies of responses within AC and CE preference groups by theme.

Table 22

Qualitative Item 6 Response Frequency for the AC-CE Continuum

Response Themes	AC	CE	Neutral
Time	16	23	4
Resources	5	11	0
Improved Collaboration Structures	4	12	4
Structural Changes	3	2	1
Communication	3	1	0
Other	2	2	0
No Changes Needed	2	2	1
No Responses	7	5	5

Note: N = 115

The theme frequency distribution within the AE-RO continuum was also indicative of the whole participant group results, with the time, resources, and improved collaboration structures themes being the most frequent. Table 23 summarizes the frequencies with participants grouped by their AE-RO preference. The RO preference group did not indicate a need for communication changes, and both improved collaborative structure responses indicated that observations should be incorporated as part of improving collaboration. This directly aligns with the RO preference to watch and ask questions as part of the learning process per Kolb's (1984) descriptions.

Table 23

Qualitative Item 6 Response Frequency for the AE-RO Continuum

Response Themes	AE	RO	Neutral
Time	36	2	5
Resources	14	1	1
Improved Collaboration Structures	15	2	3
Structural Changes	4	1	1
Communication	4	0	0
Other	4	0	0
No Changes Needed	3	1	1
No Responses	13	2	2

Note: N = 115

Summary

Data collected from the multiple portion surveys was processed using multiple analyses. Frequencies and descriptive analyses were reported for both the *Critical Issues for Team Consideration* survey (DuFour et al., 2006) and the ELT survey constructed for this study. Survey items were clustered together based on theme and cluster scores were used though a Pearson correlation analysis to determine connections between PLC structures and self-identified participant learning preferences. Significant correlations were found for 12 combinations at the 0.05 level. The hypothesis for the quantitative portion of the study was supported, indicating significant correlations between PLC structures and self-identified participant learning preferences in these 12 areas. The null hypothesis was rejected, as correlations were found in 12 areas.

Qualitative item responses were coded and reported through frequencies as applied to the entire participant group and within preference groups across both the AC-CE and AE-RO learning dimension continuums. Qualitative connections between responses and specific learning preferences were identified and reported. The application of the reported results as applied to each research question is discussed in Chapter Five.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Overview

The purpose of this study was to explore the relationships between Professional Learning Community (PLC) structures and self-identified teacher learning styles. PLCs are a common structure for teacher collaboration centered around student performance outcome data analysis and developing best instructional practices (DuFour & Eaker, 1998). PLC systems were implemented nationally in schools as a response to meeting state and federal student performance outcomes through NCLB and the current Race to the Top ESEA reauthorizations. As part of the PLC collaborative process, teachers must develop their instructional implementation skills through planning with their instructional team using student performance criteria and assessment data as the basis for systems decisions.

The PLC process is focused on student outcomes, but within the process is a need for teachers to learn and develop their practices based on outcomes of implementation. Using the Experiential Learning Theory (ELT) developed by Kolb (1984) as the structure for discussing teacher learning preferences, this study examined teacher perceptions of effectiveness as it relates to their PLC practices and how their learning was supported within the PLC collaborative structure. This study acts as an initial exploration of these connections.

Data was collected through an online survey with sections devoted to self-identifying learning preferences through an ELT instrument developed specifically for this study, determining the perception of effectiveness in PLC practices through the use of the *Critical Issues for Team Consideration* survey (DuFour et al., 2006), and qualitative items requesting participants to share their perceptions of how their learning was supported through their PLC practices. Correlations were analyzed between the results of the ELT instrument and the PLC survey items, with results supporting the hypothesis that teacher-identified strengths of PLC structural components correlated with self-identified teacher learning preferences. The null hypothesis was rejected based on the correlation analyses. Qualitative data was coded and combined into themes to further develop descriptive detail of the participant perspectives on PLC supports through their learning preferences across two continuums (D. A. Kolb, 1984).

This study addressed three research questions. The primary research question was, "How do teacher perceptions of the effectiveness of implementation and work within PLC structures and strategies align with self-identified learning preferences?" Additional research sub-questions included

- How do teachers within structured collaboration systems, such as PLCs, perceive their learning process?
- Do strong indications of teacher learning relate to strong ratings of PLC structures?

Each of the research questions will be addressed throughout Chapter Five.

Description of Sample

115 elementary school teachers completed the survey. All of the teachers were from the same school district within southern California, serving approximately 24,000 students. The district was selected for use due to the district's prioritization of PLC structures within the school setting for nearly ten years. This level of implementation ensured that the participating teachers had familiarity with PLC structures regardless of their time within the district. Demographic information was collected regarding gender, ethnicity, and years experience in the field of education and within the district. The participant sample featured 94 (81.7%) females and 21 (18.3%) males. The White (N = 83, 72.2%) and Hispanic (n = 21, 18.3%) ethnicities constituted the majority of the population. Experience levels of participants can be reviewed in Table 2 within Chapter Four, and were used only for population sample descriptive purposes.

Professional Learning Communities and Learning Preference Alignment

The primary research question for this study was, "How do teacher perceptions of the effectiveness of the implementation and work within Professional Learning Community structures and strategies align with self-identified learning preferences?" An associated sub-question for the study was, "Do strong indications of teacher learning relate to strong ratings of PLC structures?" In order to answer this question, a correlation analysis was built using data provided from the ELT survey items and PLC survey items. The ELT

survey section was clustered into learning preference scores based on the construction of the items as part of the design of the instrument during the initial stages of this study. Each item was developed to align with descriptions of each learning preference as described by Kolb (1984), allowing for a cluster score to be developed within each of the learning areas for each participant. Using the learning dimension continuums from Kolb (1984), the cluster scores were calculated together to generate a value placing the participant on each continuum. Participants were then grouped for analysis based on their preference scores, with each participant being placed on the AC-CE continuum and the AE-RO continuum. Neutral scoring participants for either continuum are considered equally adept at the two preferences on that continuum. It is important to note that the AC-CE continuum addresses learner perception, while the AE-RO continuum addresses learner processing. These two continuums combine to fully define the learner, however this study used each preference separately in an effort to develop better understanding of each learning preference role within PLC perceptions.

The *Critical Issues for Team Consideration* survey (DuFour et al., 2006) was used to rate PLC practice effectiveness. The items on the PLC survey were clustered based on the content of the items, allowing for cluster scores to be developed into seven categories. These seven categories were: team norming, SMART goal setting, student outcome criteria, curricular alignment, academic intervention, formative assessment, and summative assessment.

Correlation significance was noted in 12 areas between PLC structure clusters and learning preference cluster scores. Two PLC clusters, student outcome criteria and academic intervention, were significantly correlated to all four learning styles, indicating that these items are highly rated by those with corresponding high cluster scores in each of the four learning preference areas (see Table 7). It could be interpreted that the entire participant pool, regardless of their learning preference, scored these PLC practices as being effective. This could indicate that PLC practices within the district have prioritized these two structures as part of their on-going practice, therefore having participants consistently view these practices as effective regardless of their learning preference.

Two learning preferences showed significant correlation with other PLC structures. AC preference groups (R^2 = .274, *sig.* = .003) significantly correlated with the summative assessment cluster group. AC preference learners tend to seek answers through thought and insight, using analytical and symbolic representations to add to their knowledge base. These learners tend to use research and theory to help drive their responses, taking the abstract concepts and theories and applying them via their place on the AE-RO continuum. The correlation with the summative assessment cluster of the PLC survey aligns with the AC learning preference in that the data and information gathered from summative assessments is used to give a global picture of the effectiveness of

instructional practice, allowing for further application of theory and research to determine the best course of action or alteration to the instructional routine.

The RO learning preference was significantly correlated across five of seven PLC structures. In addition to the student outcome criteria (R^2 = .331, *sig.* = .001) and academic intervention (R^2 = .286, *sig.* = .002) clusters that all four preferences significantly correlated with, RO preferences also significantly correlated with the team norming (R^2 = .247, *sig.* = .008), curricular alignment (R^2 = .252, *sig.* = .007), and summative assessment (R^2 = .196, *sig.* =.036) PLC item clusters. This indicates that high RO scores correlated within high effectiveness PLC effectiveness ratings in these areas. The large number of correlations between the RO learning preference and PLC cluster scores indicates that RO learners benefit well from PLC collaborative work, and may play a vital role in the process.

As opposed to the AC learning preference that lies on the continuum focused on the perception of learning, RO preferences lie on the processing continuum indicating how the learning interacts with the learning process. RO preference learners prefer to watch and observe, asking questions and thinking about the process outside of direct interaction with the learning. Collaborative processes focused on using data and resources to develop instructional systems seem to fit into the RO preference descriptions, as supported by the multiple areas of correlation within this study. Although the RO group (n = 9) was a small sample group within the study population, the RO learning preference group

appears to play an important role within the PLC collaborative process. The low sample size for RO preference participants was supported somewhat by Kolb (1984), who determined through his use of the LSI and development of ELT that elementary teachers would rate highly in the CE preference and be more likely to land on the AE end of the AE-RO continuum.

Analysis of Research Hypotheses

The research hypothesis for this study was, “Teacher identified strengths of PLC structural component effectiveness will significantly correlate with self-identified teacher learning preferences.” Using a correlation analysis, this hypothesis was testing using the PLC cluster score results and the cluster scores from the learning preference items. 12 significant correlations were identified through the correlation analysis, with 11 significant to the 0.01 level and one significant to the 0.05 level.

As discussed in Chapter Four, the hypothesis was supported by these 12 significant correlations, indicating that all four learning preferences analyzed were significantly represented within the correlation analysis. Additional significance was found within the AC and RO preference groups, as both preferences showed additional significant correlations to PLC structures that were not shared by all four learning preference groups. These findings rejected the null hypothesis, as correlations were found between PLC structure ratings and teacher learning preferences.

Professional Learning Community Participant Perceptions of Their Own Learning

A research sub-question was posed as part of developing the study that asked, “How do teachers within structures collaboration systems, such as PLCs, perceive their learning process?” Participants within the study generally perceived the PLC structures to support their own professional learning. 100 (87.0%) participants indicated that they believed PLC structures supported their professional learning through the selected response item at the outset of the qualitative data segment, with 15 (13.0%) indicating that they did not agree with the statement. The remaining qualitative items were designed to further respond to the research sub-question, and were analyzed through the learning preference lens in an effort to determine whether learning preferences influenced these perceptions.

Common themes arose across the qualitative item responses. Communication was a theme represented in all five text-entry items. When asked to provide information regarding supportive or crucial structures and elements, participant response frequencies placed communication as the most frequent on Qualitative Items 2 ($N = 41$, 35.7%) and 3 ($N = 39$, 33.9%), and second most frequent on Qualitative Item 5 ($N = 18$, 15.7%). In each case, participants identified discussion and sharing with others as priorities for being supported within teams. The high frequency of communication remarks was supplemented on Qualitative Items 2, 3, and 5 by supporting themes that involved communication skills. The themes of collaboration, planning, and

respect for teammates had the highest remaining frequencies on these items aligned to most supportive systems. Although communication was noted in Qualitative Items 4 and 6, these least supportive or change-oriented items each indicated at least three themes more frequently than communication. Communication appeared to be a similar priority for all learning preference groups, as the frequency of responses when the participants were grouped based on placement on either continuum supported the whole sample response frequencies.

Qualitative Items 4 and 6 required participants to determine the least supportive structure and identify a change that could better support their learning. Time was the primary driving structure or element within both of these items, with 27 (23.5%) respondents noting time usage as least supportive of learning in Qualitative Item 4, and 43 (37.3%) respondents noting that increases in time or more effective use of time was needed to better support their learning within PLCs. Reorganization of the participants into their learning preference groups appeared to have similar frequency results, indicating that learning preference has little in their views on their learning process.

When using the lens of learning preferences as discussed throughout the study, some cumulative observations can be made using the combined information from the entire set qualitative data. Along the AC-CE continuum focused on perception of learning, communication would be a vital aspect to understanding the perceptions of the AC and CE preference learners. AC

preference individuals need to think and comprehend however they do not necessarily align with group work structures. Their need for communication involves discussion following their time to think and process information in conjunction with thought and testing possible outcomes. CE preference learners want the group structure, needing feedback from the group as part of their concrete understanding of the process at hand.

Similarly, the AE-RO continuum features differing communication needs. The AE-RO continuum focuses on process and interaction with the learning experience, with the two groups separated by active and reflective actions. AE preference learners are more likely to actively participate in learning sessions, communicating while the active interaction is taking place. RO preference participants generally prefer to reflect prior to sharing ideas, and prefer to listen to other opinions while in groups as part of developing their own ideas prior to communication. An example of this difference was described within the data for Qualitative Item 4, where AE preference participants frequently indicated issues with personality conflicts as being least supportive of learning within PLC structures, while the RO preference participants did not indicate this item. With the established correlation between high PLC ratings in team norming for the RO preference group, the role of individuals with the RO preference may be needed to help mitigate some of the perceived personality conflicts experienced by those with an AE preference. Given the differences of interaction featured by all four styles and the PLC requirement of extensive time working within a team,

communication must be a priority for all participants within the group dynamic, with each individual participant adding a different layer to the collective processes.

Implications

This study was initially conceived as a possible resource for school site administrators to increase performance of their PLC teams through understanding the dynamics of individual perception of PLC structures. Administrators are constantly searching for ways to increase the effectiveness of their site instructional programs, and the use of PLC structures within schools has become a mainstay for developing instructional practices at the site level. Therefore, administrators need to be focused on attempting to create and develop teams that are able to generate successful results through the installed collaborative systems. Since research supports grade-level teams making an impact on student outcomes and school-level effects (Saunders et al., 2009), the site administrator needs to constantly search for ways to improve their understanding of team dynamics as part of creating high-functioning teams.

The results of this study indicate two main considerations as it applies to using learning preferences in developing quality collaborative teams. Although there are certain structures that all learning styles support within collaborative systems, the process may benefit the addition of more AC and RO oriented individuals. The PLC process as a whole requires participant understanding of

instruction, assessment, intervention, and planning with the goal of improving student performance outcomes. The integration of these ideas requires a balance of theoretical understanding and practical application in order to design instructional practices that lead to successful learning and assessments that both accurately measure learning and gather appropriate data for use in instructional planning. This requires different skill sets within teams, and a need for a balance of active and reflective learners collaborating within PLC teams. Imbalances in the team may lead to limited outcomes if structures that are supported by specific learning preferences are not considered as part of team construction.

The correlations within this study seem to indicate that the RO learning preference has a vital role to play within the PLC team. Kolb (1984) notes that elementary teachers are best defined as a combination of CE and AE preferences, which was consistent within the results produced by the ELT instrument within this study. The preponderance of this group within collaborative groupings may be limiting to PLC team effectiveness. Although AC preference appears to have a correlation with summative assessment structures, the RO preference has a larger impact based on the results of this study. Therefore, one consideration for administrators is to use an ELT style assessment to determine the learning preferences within their staff, and use the information to ensure that grade level teams are constructed with a distribution of the four learning styles to benefit the collaborative process with specific focus on the distribution of individuals with the RO preference.

The second consideration involves consistent attention to communication processes within the teams. Communication was the driving theme of the qualitative data within this study. As a focal point for interaction, administrators need to work towards assisting teams with communication structures as part of PLC systems implementation and monitoring. This approach must be balanced, as too much structure will limit the AE preference need to actively learn but enough structure to satisfy the more introspective needs of the RO and AC preferences. This will present itself as more of an issue with those individuals scoring at the extreme ends of a continuum, as these individuals will need to be supported more specifically than those more centered on the matrix. Communication style staff training may be appropriate as part of combining learning preference teachers onto a team in order to assure that needs are met.

Another implication involves the PLC process itself. Although the process is framed as “Learning by Doing” (DuFour et al., 2006), the process itself has significant reflective processes and abstract concept application. This would indicate that the more active adult learning preferences, such as CE and AE preferences, may not be the preferred groups to completely build a team around. This may lead to a need to change perspectives on the types of individuals being hired for teaching positions at the site level in an effort to incorporate more reflective and abstract learners to the elementary school setting as long as collaborative structures similar to PLCs are being implemented.

Limitations

This study was designed to be explorative in nature, and therefore may not be generalizable to the larger population. The district selected was a convenience sample, further impacting generalizability. Although participants were invited from throughout more than fifteen elementary schools within the district, the experience of these teachers has been defined by a single district's priority set, and therefore may not be representative of participants within districts with different priority sets or systemic implementations. In addition, the study was contingent on a familiarity with PLC structures. At schools using other collaborative structures, the cluster groupings and survey tools may not be appropriate to accurately rate effectiveness.

Another limitation of the study involves the survey items. The ELT instrument was developed specifically for this study, and may not produce consistent results across other populations. Although the ELT survey was piloted with a small test sample, there were no validity or reliability measures for the developed ELT survey at the time of the study. This could be considered as a threat to the internal validity of the study. In addition, the *Critical Issues for Team* Consideration survey (DuFour et al., 2006) was crafted as a survey for professional use within schools to rate the effectiveness of PLC teams. There are no validity or reliability measures for the PLC survey used for rating effectiveness, which may also be considered a threat to internal validity of the

study. Further analysis, validity testing, and reliability testing of the survey instrumentation must be made prior to furthering use across other populations.

PLC clusters were developed using a coding system, not any type of cluster analysis. PLC survey items were grouped based on the PLC structural components referred to within the item text. This was a limitation to the study, as formal cluster analyses using a larger data set may indicate differences within item cluster groups.

The results of this study must be interpreted as time-based and cross-sectional in nature. PLC effectiveness ratings apply to only the current construction of the team, training level, site and district priority set, and systems integration. As any of these factors change, the individual participant ratings will adjust. In addition, learning preferences through the ELT lens may be subject to change over time for learners based on their interaction within their learning environment. Therefore both the PLC ratings and the ELT preference scores must be taken within the current context of participant experience.

Directions for Future Research

Due to the exploratory nature of this study, these findings can extend in multiple directions for future research. Additional studies should be made to extend the literature surrounding connections between learning preferences and teacher collaborative practices. With the implementation of Common Core State Standards, continued use of collaborative structures, like those within the PLC

model, will need to be in place as systemic changes are made throughout the K-12 educational system. As state and federal accountability measures align with new adaptive and performance task assessment systems, teacher team collaboration will need to be effective in order to continuously improve student performance outcomes.

Further research questions can be developed from initial findings within this study involving the role that the RO learning preference may have in successful PLC teams. The participant group within this study was from many different grade level teams; however research focusing on teacher learning within team configurations with known learning preference combinations would be of interest. The literature could also be advanced through an analysis of teacher learning within PLC teams that have been identified as highly successful teams through a measure of student performance outcomes or impact on district systems.

An exploration of PLC team configuration using learning style preferences would also advance the available literature. Using a cause-effect model, research could be conducted to determine the “best approaches” for team construction within collaborative structures. This work could be combined with the study of the impact on structured collaborative practice, such as PLCs, when teachers have an awareness of their personal learning preferences.

Further research regarding the instrumentation used within this study should be considered. Although the LSI (D. A. Kolb, 1984) and RLSI (Manolis et

al., 2013) have been tested for validity and reliability, the ELT instrument within this study was not at the time of this study. Similarly, the limitations of the PLC survey used involve validity and reliability concerns. Research regarding the instrumentation used within this study may prove valuable for additional research regarding the connections between teacher learning preferences and PLC structures.

Further research regarding communication within PLC structures would be relevant. Developing research-based practices and systems to sustain positive and productive communication within PLC collaborations would be of benefit in maintaining highly effective teams. Additional qualitative research to determine in depth the experiences and perceptions of teachers with specific learning preferences within PLC systems would bring forward information that may provoke more questions regarding interactions between PLC team members.

Conclusions

The results of this study suggest that various PLC structures significantly correlate with ELT learning preferences. PLC structures are implemented to focus on continuous school improvement and to develop and increase in student performance outcomes (DuFour & Eaker, 1998). As teams develop and work together, various facets of team dynamics become focal points for administrators to build highly effective teams at their sites. Use of learning styles as a tool to

help determine teacher teams appears to have promise, and with continuing research may prove to be beneficial within the elementary school setting.

Communication has been identified as a contributing factor in supporting teacher learning within PLC structures. Due to different learning needs of teachers within collaborative teams, and understanding of teacher learning styles may help to build upon strengths and create highly functioning teams.

It is the goal of all administrators to create high-performing and high-functioning learning systems in their schools. Significant effort has been invested in determining how to best increase student performance outcomes; especially those aligned to achievement on academic skills and compliance measures. The learning group that is often overlooked is the teaching staff, which needs to constantly adjust systems and structures to meet the developing needs of students within the classroom. Understanding how teachers learn within the context of their role as educators may prove to be a vital component in producing true Professional Learning Communities. A participant in this study noted in an item response:

> Since I learn best by asking others, looking at multiple strategies, and obtaining ideas, I then make my own decision on how best to teach my students. As a result, PLC structures are how I become the best teacher that I can be (Participant 106, March 2015).

APPENDIX A

EXPERIENTIAL LEARNING THEORY

SURVEY ITEMS

Learning Preferences Survey Items

Please rate the following comments as they apply to you.

1. I learn best by my own concrete experiences. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

2. I learn best by thinking about situations. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

3. I learn best by asking questions. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

4. I learn best by verifying information. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

5. I learn best by doing. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

6. I learn best by watching others. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

7. I learn best by seeking answers. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

8. I learn best by looking for patterns. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

9. I learn best by relating with others. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

10. I learn best by using linear processes. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

11. I learn best by using observations. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

12. I learn best by experimenting. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

13. I learn best by determining what works in a situation. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

14. I learn best by impartially describing situations. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

15. I learn best by understanding unique and specific areas of the situation. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

16. I learn best by using the present reality of a situation, not about what could be or should be. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

17. I learn best by using an artistic or creative approach. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

18. I learn best by planning systems or using established approaches. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

19. I learn best by using different perspectives. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

20. I learn best by getting things accomplished. *
Mark only one oval.

1 2 3 4 5

Not Preferred Highly Preferred

APPENDIX B

PROFESSIONAL LEARNING COMMUNITY SURVEY ITEMS:

CRITICAL ISSUES FOR TEAM CONSIDERATION SURVEY

Professional Learning Communities

Critical Issues for Team Consideration survey from: DuFour, R., DuFour, R., Eaker, R., & Many, T. (2006). Learning by doing: A handbook for professional learning communities at work. Bloomington, Indiana: Solution Tree.

Use the following rating scale to indicate the extent to which each statement is true of your team.

1, 2, 3 = Not true of our team 4, 5, 6, 7 = Our team is addressing this issue 8, 9, 10 = True of our team

1. We have identified team norms and protocols to guide us in working together.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

2. We have analyzed student achievement data and established SMART goals to improve upon this level of achievement we are working interdependently to attain.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

3. Each member of our team is clear on the knowledge, skills, and dispositions (that is, the essential learning) that students will acquire as a result of (1) our course or grade level and (2) each unit within the course or grade level.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

4. We have aligned the essential learning with state and district standards and the high-stakes assessments required of our students.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

5. We have identified course content and topics that can be eliminated so we can devote more time to the essential curriculum.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

6. We have agreed on how to best sequence the content of the course and have established pacing guides to help students achieve the intended essential learning.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

7. We have identified the prerequiste knowledge and skills students need in order to master the essential learning of each unit of instruction.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

8. We have identified strategies and created instruments to assess whether students have the prerequisite knowledge and skills.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

9. We have developed strategies and systems to assist students in acquiring prerequisite knowledge and skills when they are lacking in those areas.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

10. We have developed frequent common formative assessments that help us to determine each student's mastery of essential learning.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

11. We have established the proficiency standard we want each student to achieve on each skill and concept examined with our common assessments.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

12. We use the results of our common assessments to assist each other in building on strengths and addressing weaknesses as part of an ongoing process of continuous improvement designed to help students achieve at higher levels.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

13. We use the results of our common assessments to identify students who need additional time and support to master essential learning, and we work within the systems and processes of the school to ensure they receive that support.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

14. We have agreed on the criteria we will use in judging the quality of student work related to the essential learning of our course, and we continually practice applying those criteria to ensure we are consistent.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

15. We have taught students the criteria we will use in judging the quality of their work and provided them with examples.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

16. We have developed or utilized common summative assessments that help us assess the strengths and weaknesses of our program.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

17. We have established the proficiency standard we want each student to achieve on each skill and concept examined with our summative assessment.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

18. We formally evaluate our adherence to team norms and the effectiveness of our team at least twice a year.
Mark only one oval.

1 2 3 4 5 6 7 8 9 10

APPENDIX C

PRELIMINARY ANALYSES SCATTERPLOTS

Figure 3

Scatterplot of CE Cluster Scores and Team Building PLC Item Cluster Scores

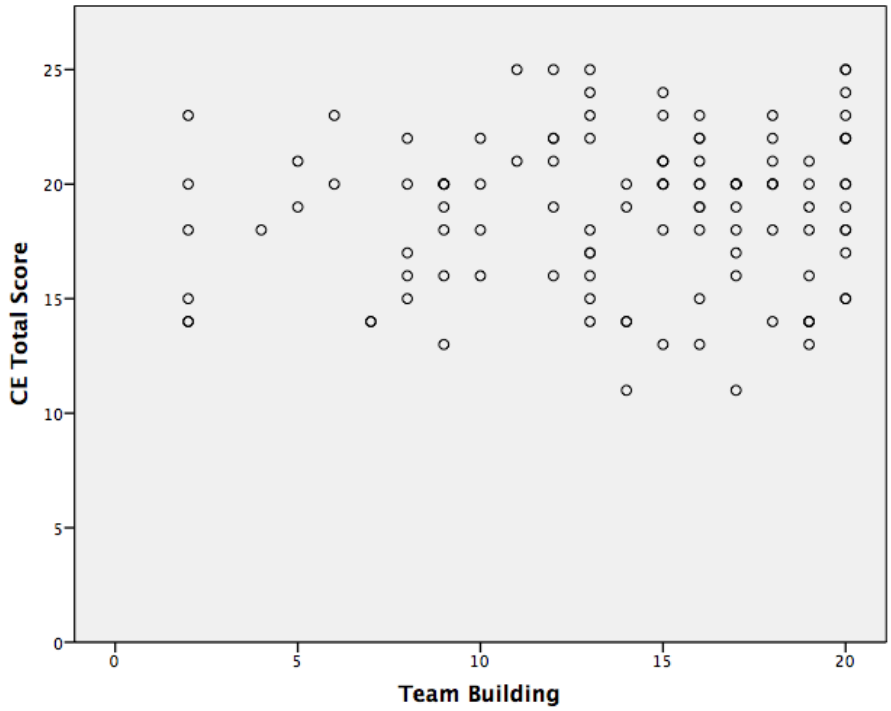


Figure 4

Scatterplot of AC Cluster Scores and Team Building PLC Item Cluster Scores

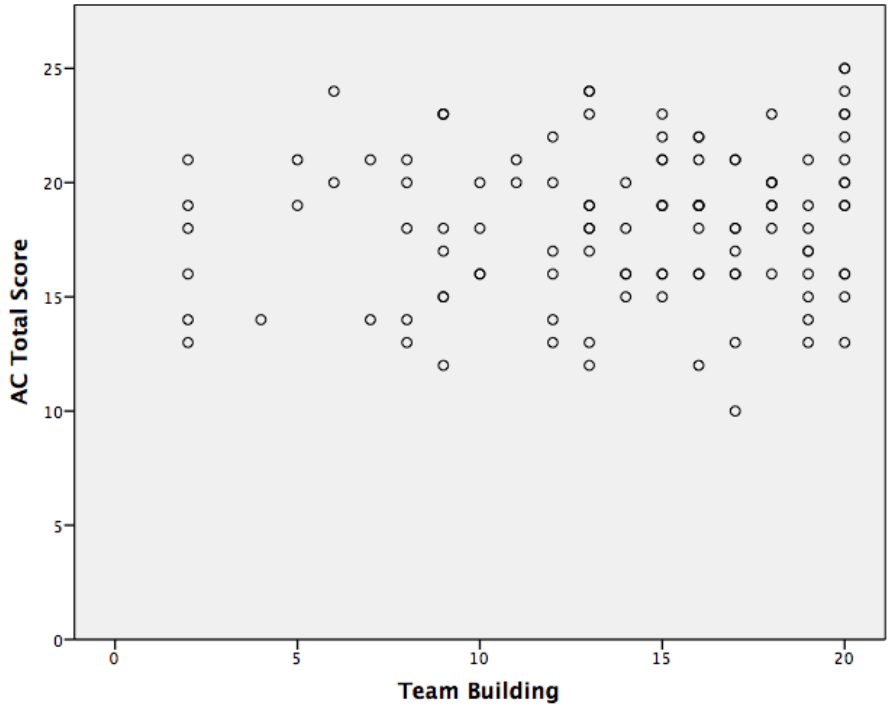


Figure 5

Scatterplot of RO Cluster Scores and Team Building PLC Item Cluster Score

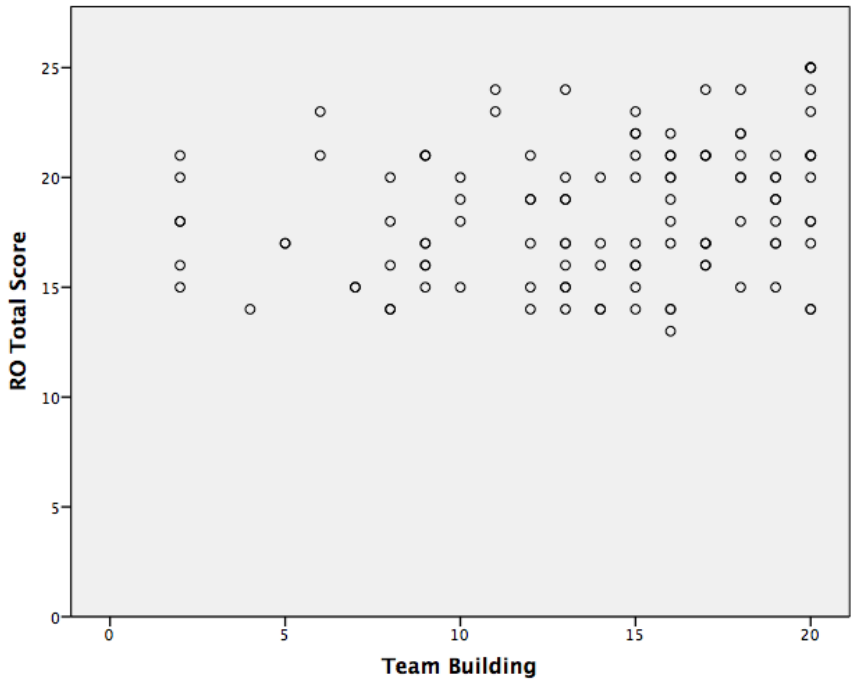


Figure 6

Scatterplot of AE Cluster Scores and Team Building PLC Item Cluster Scores

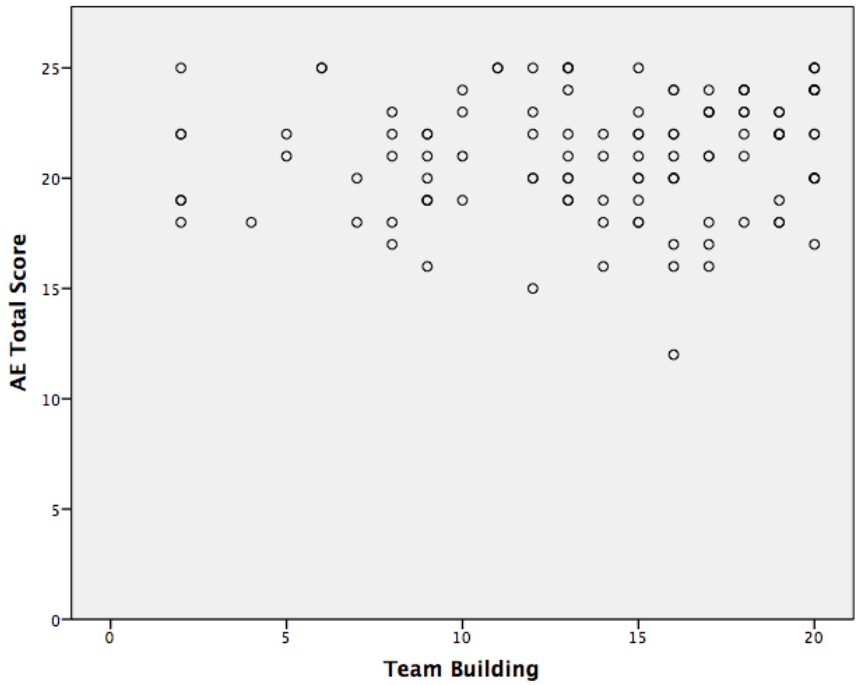


Figure 7

Scatterplot of CE Cluster Scores and SMART Goal Setting PLC Item Cluster Scores

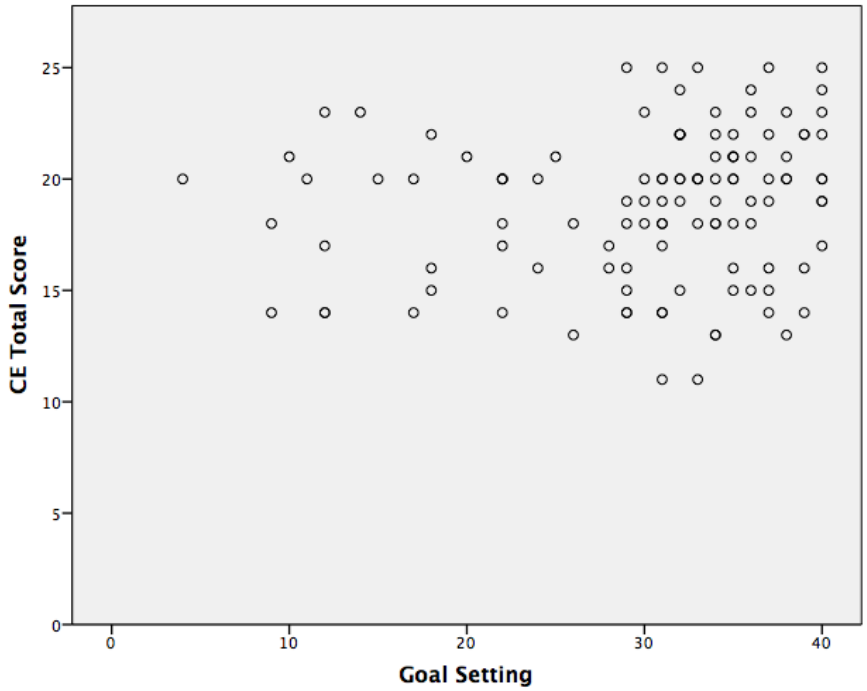


Figure 8

Scatterplot of AC Cluster Scores and SMART Goal Setting PLC Item Cluster Scores

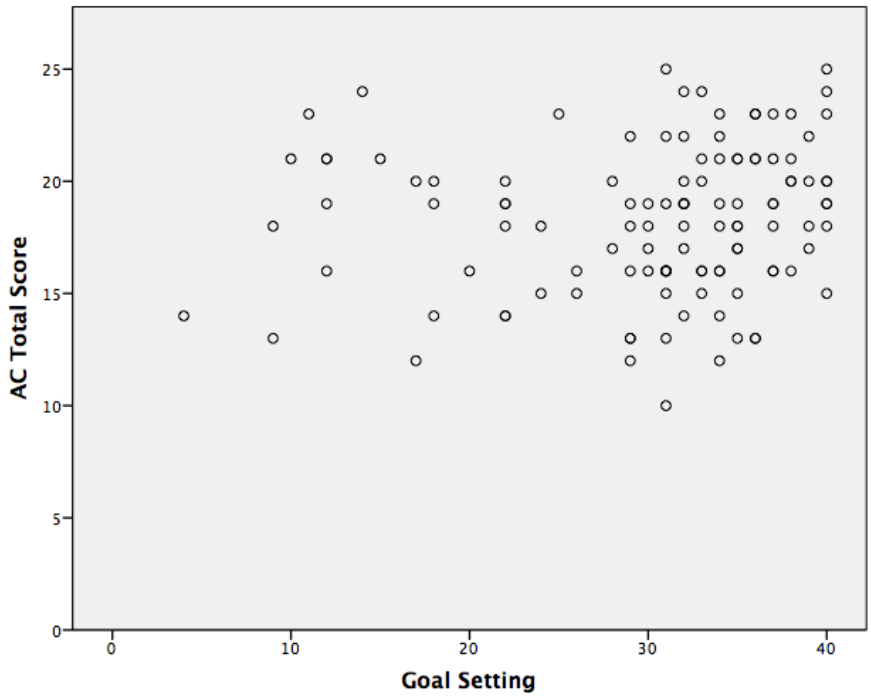


Figure 9

Scatterplot of RO Cluster Scores and SMART Goal Setting PLC Item Cluster Scores

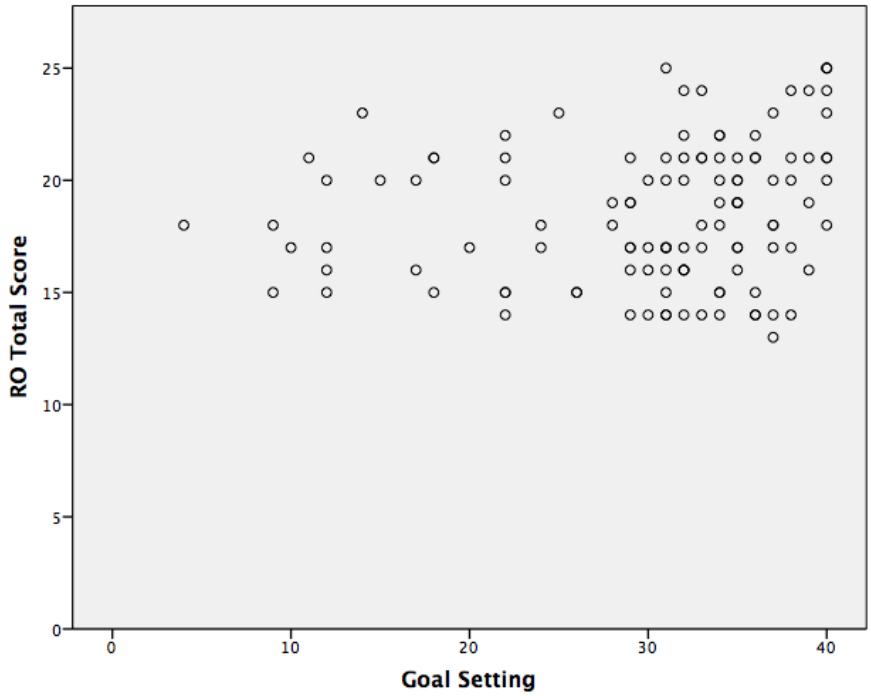


Figure 10

Scatterplot of AE Cluster Scores and SMART Goal Setting PLC Item Cluster Scores

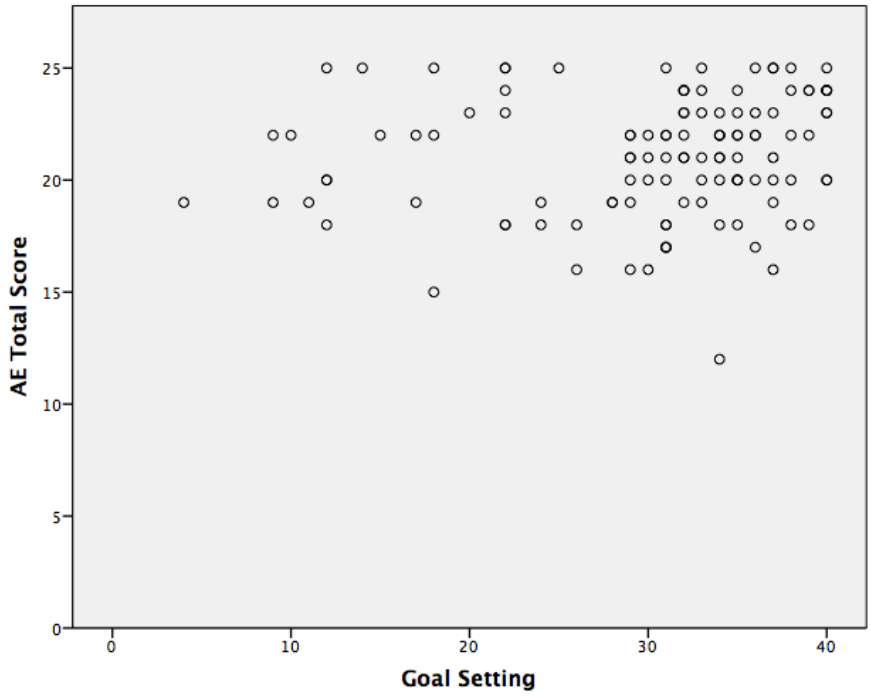


Figure 11

Scatterplot of CE Cluster Scores and Student Outcome Criteria PLC Item Cluster Scores

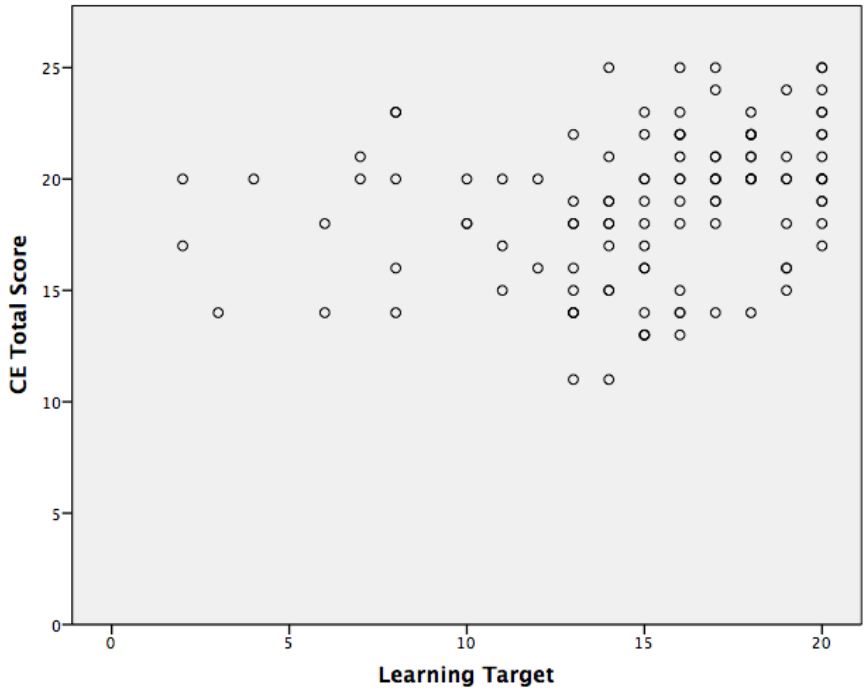


Figure 12

Scatterplot of AC Cluster Scores and Student Outcome Criteria PLC Item Cluster Scores

Figure 13

Scatterplot of RO Cluster Scores and Student Outcome Criteria PLC Item Cluster Scores

Figure 14

Scatterplot of AE Cluster Scores and Student Outcome Criteria PLC Item Cluster Scores

Figure 15

Scatterplot of CE Cluster Scores and Curricular Alignment PLC Item Cluster Scores

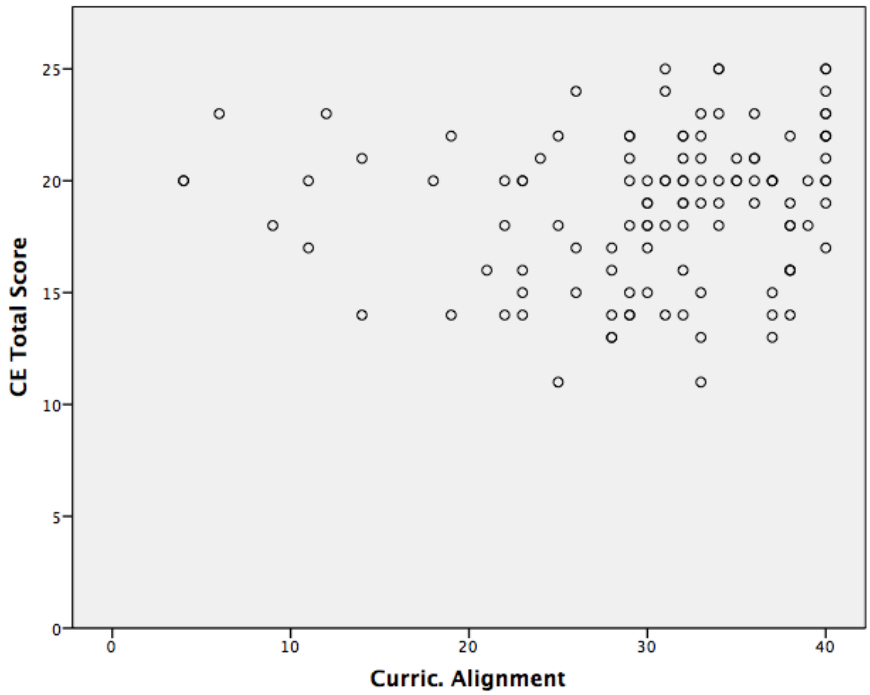


Figure 16

Scatterplot of AC Cluster Scores and Curricular Alignment PLC Item Cluster Scores

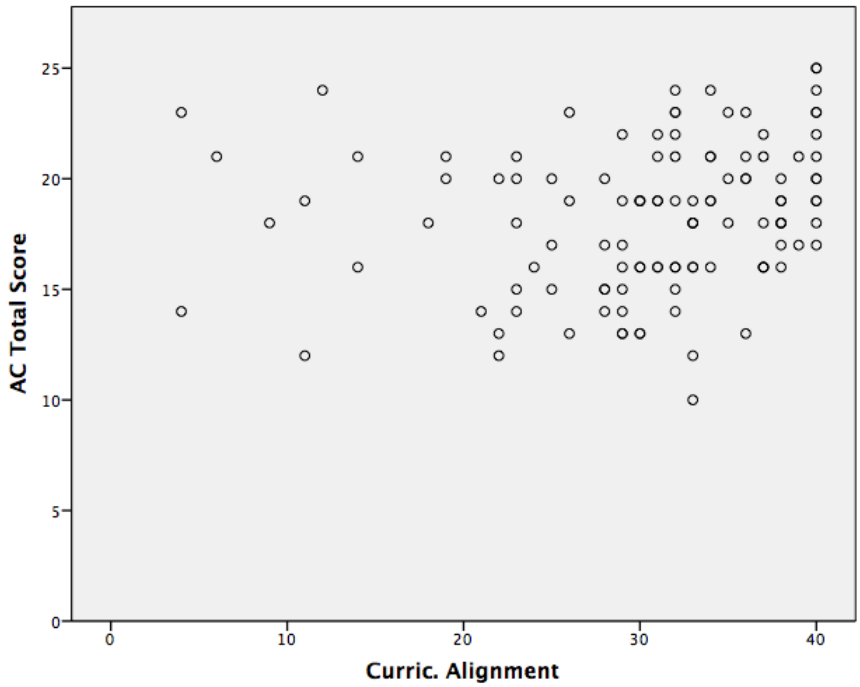


Figure 17

Scatterplot of RO Cluster Scores and Curricular Alignment PLC Item Cluster Scores

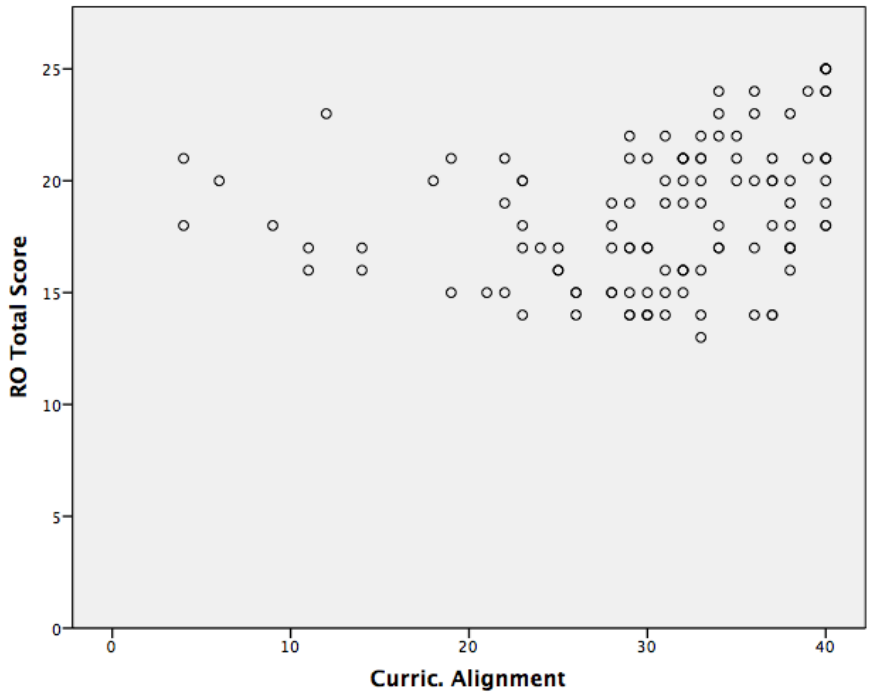


Figure 18

Scatterplot of AE Cluster Scores and Curricular Alignment PLC Item Cluster Scores

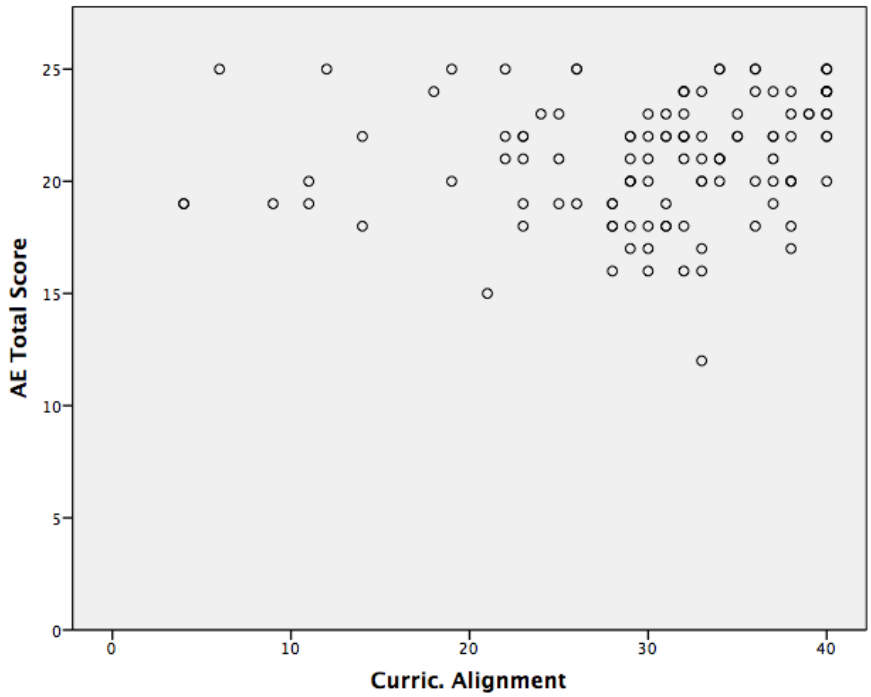


Figure 19

Scatterplot of CE Cluster Scores and Academic Intervention PLC Item Cluster Scores

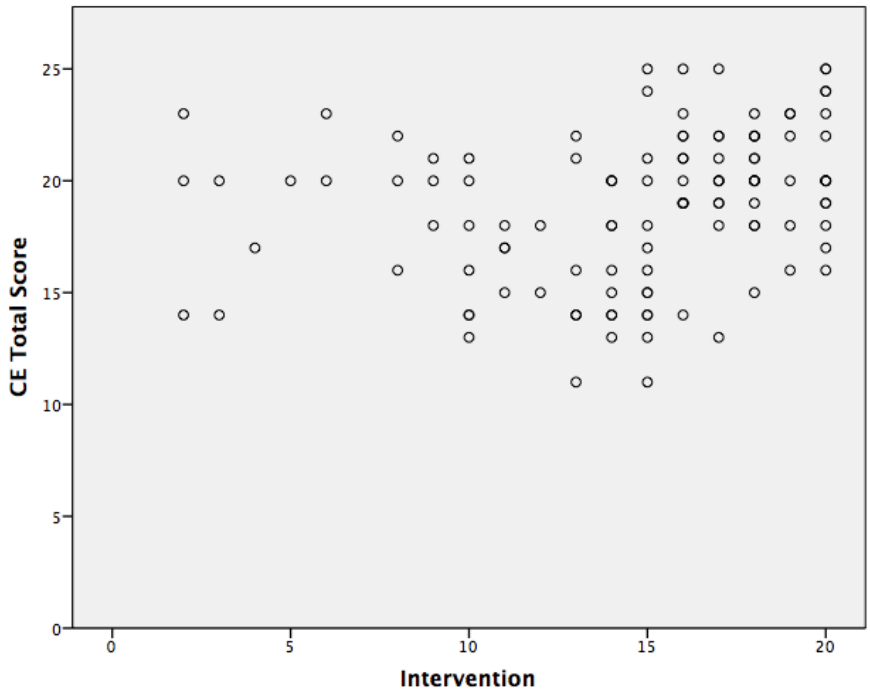


Figure 20

Scatterplot of AC Cluster Scores and Academic Intervention PLC Item Cluster Scores

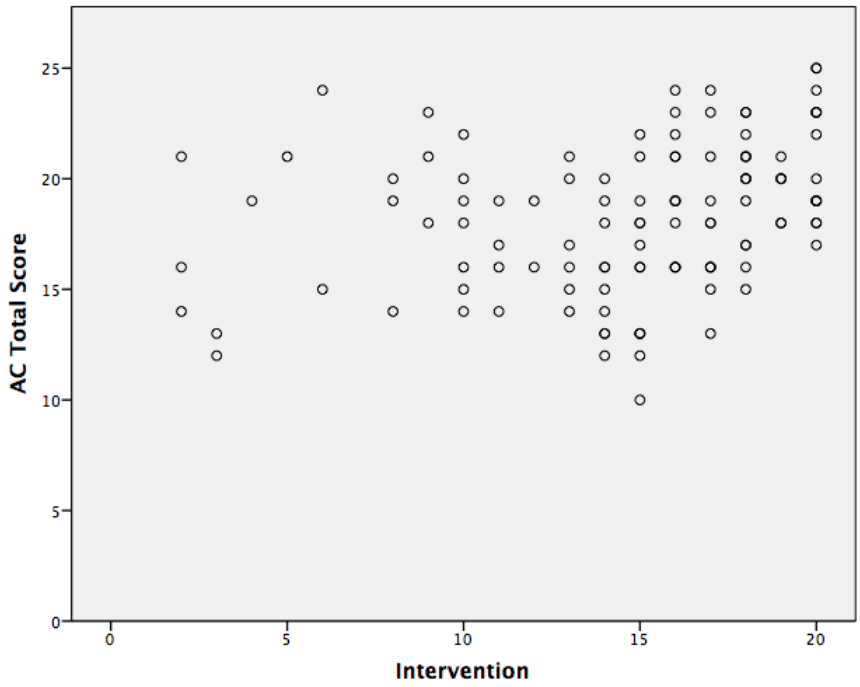


Figure 21

Scatterplot of RO Cluster Scores and Academic Intervention PLC Item Cluster Scores

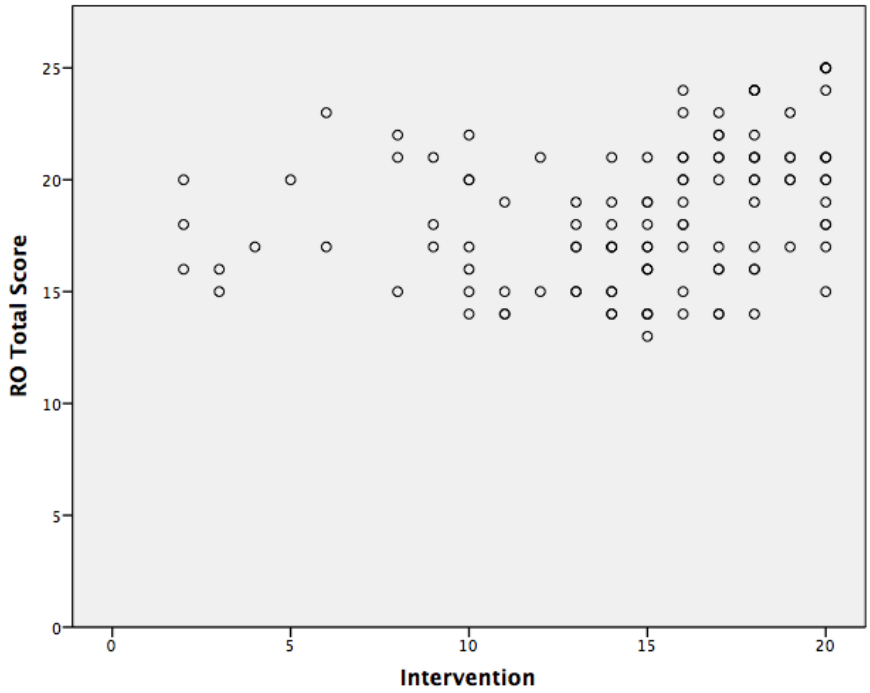


Figure 22

Scatterplot of AE Cluster Scores and Academic Intervention PLC Item Cluster Scores

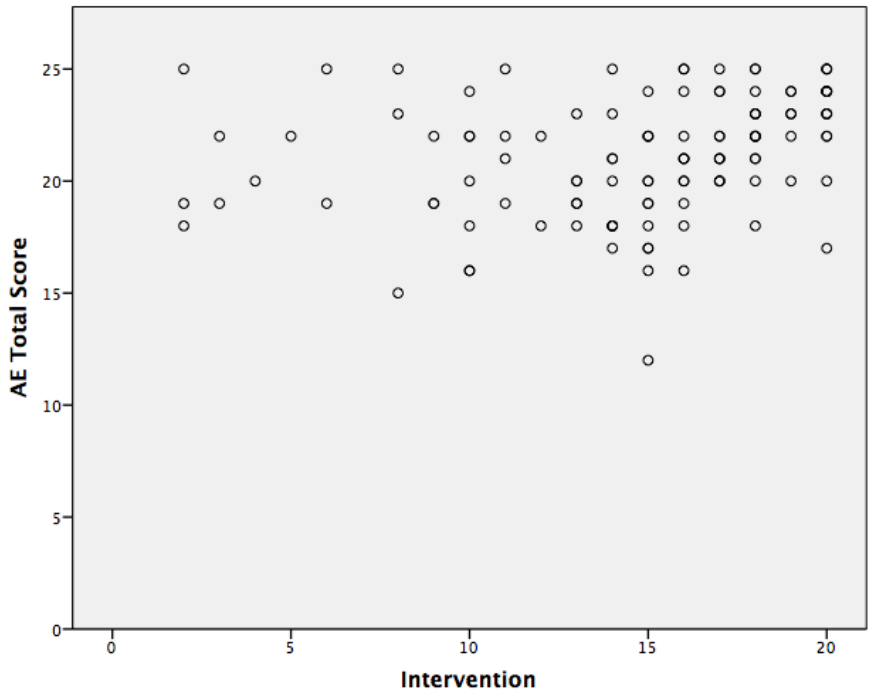


Figure 23

Scatterplot of CE Cluster Scores and Formative Assessment PLC Item Cluster Scores

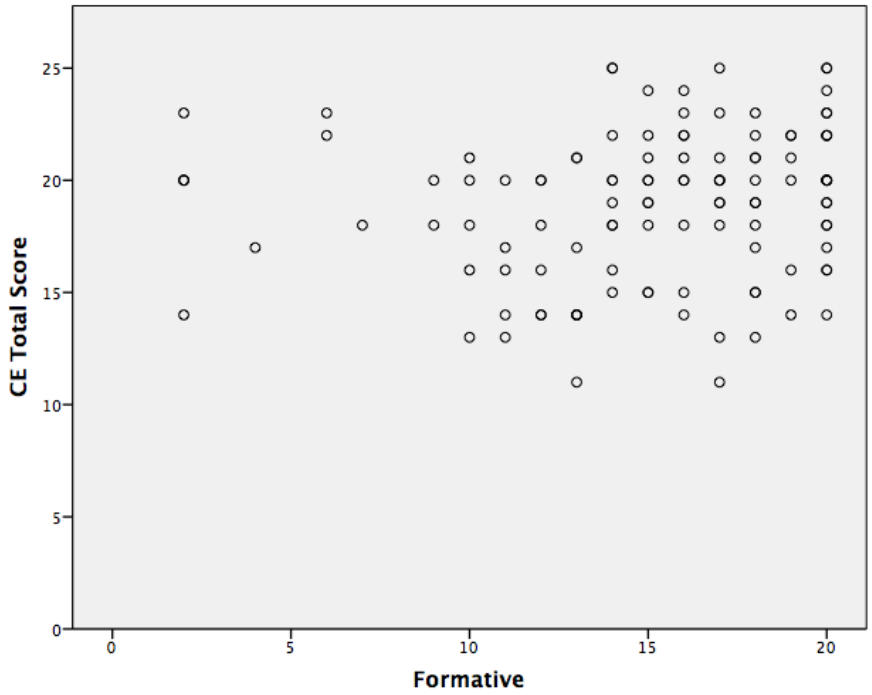


Figure 24

Scatterplot of AC Cluster Scores and Formative Assessment PLC Item Cluster Scores

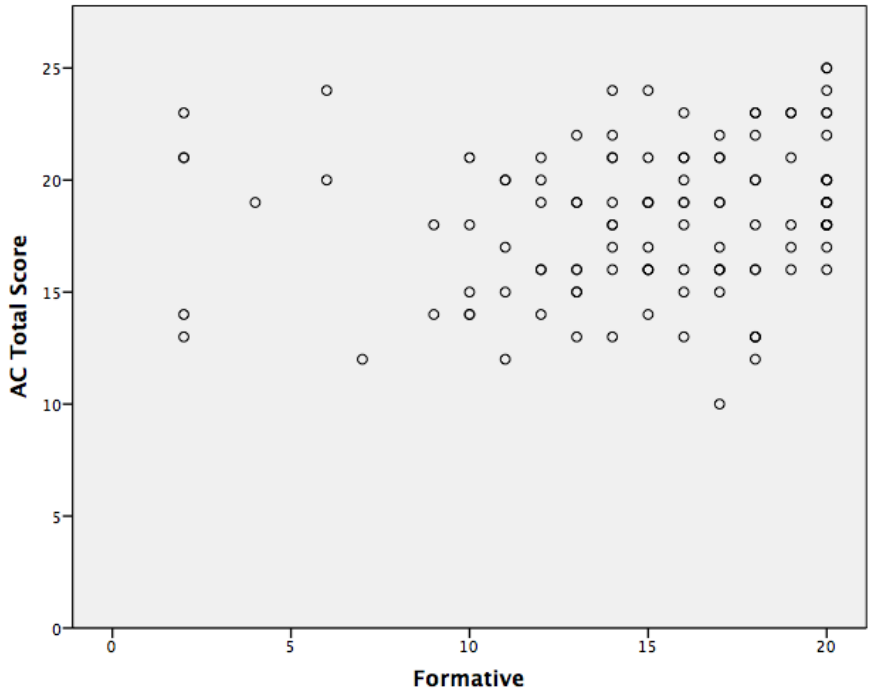


Figure 25

Scatterplot of RO Cluster Scores and Formative Assessment PLC Item Cluster Scores

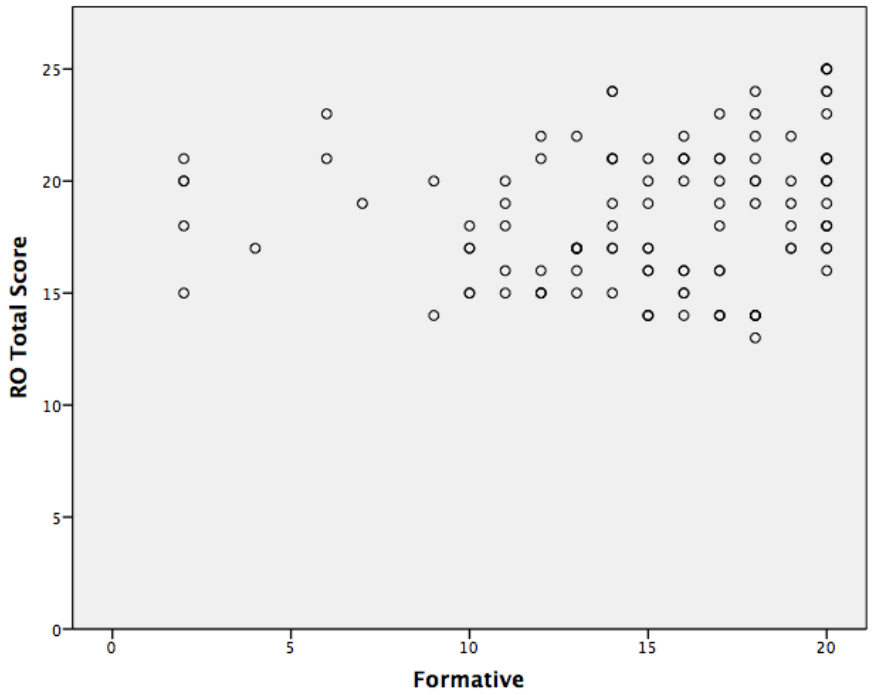


Figure 26

Scatterplot of AE Cluster Scores and Formative Assessment PLC Item Cluster Scores

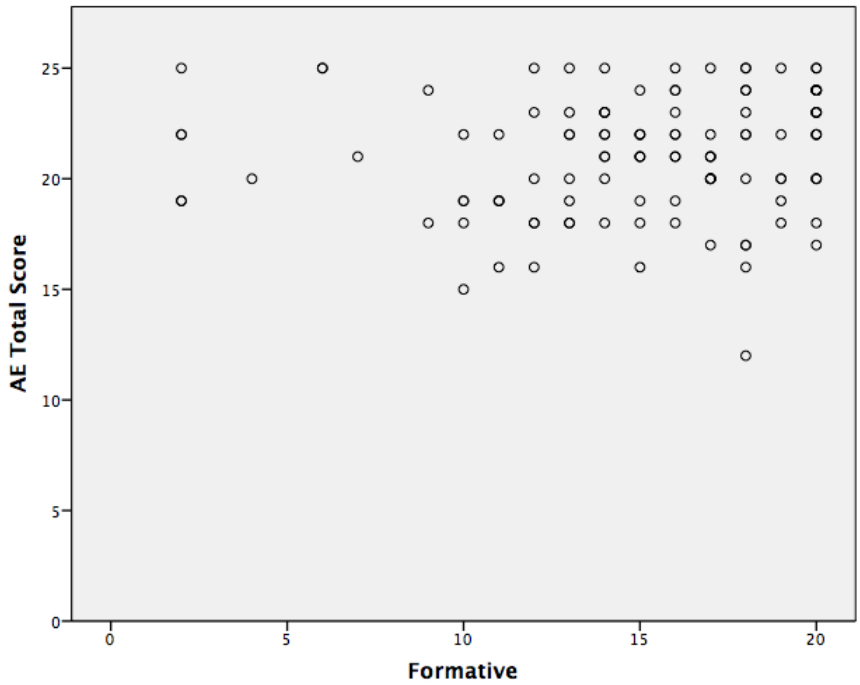


Figure 27

Scatterplot of CE Cluster Scores and Summative Assessment PLC Item Cluster Scores

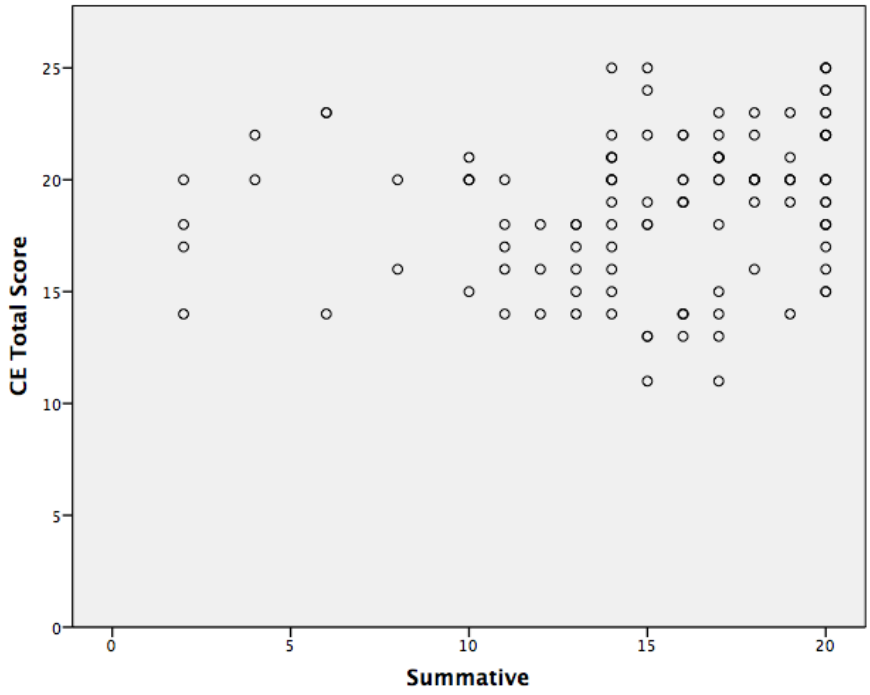


Figure 28

Scatterplot of AC Cluster Scores and Summative Assessment PLC Item Cluster Scores

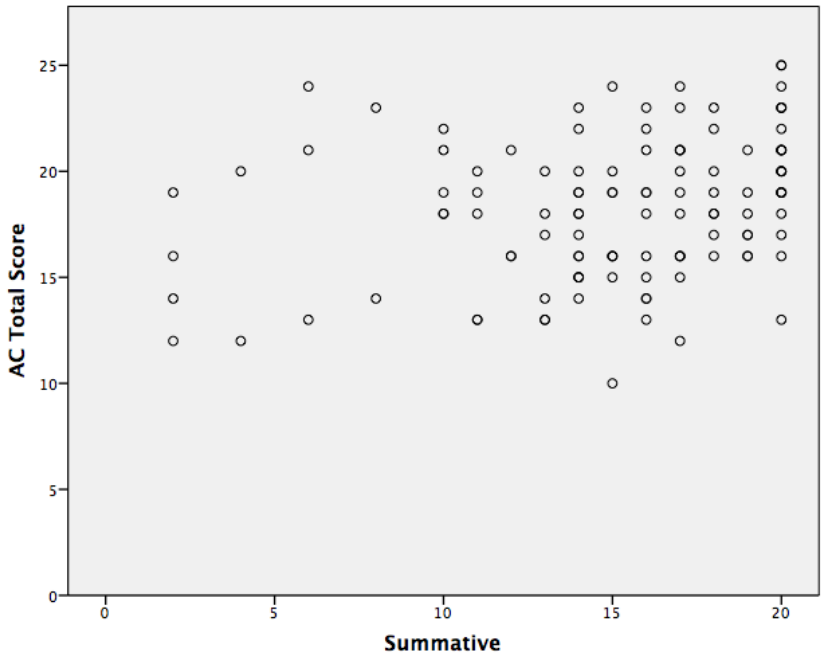


Figure 29

Scatterplot of RO Cluster Scores and Summative Assessment PLC Item Cluster Scores

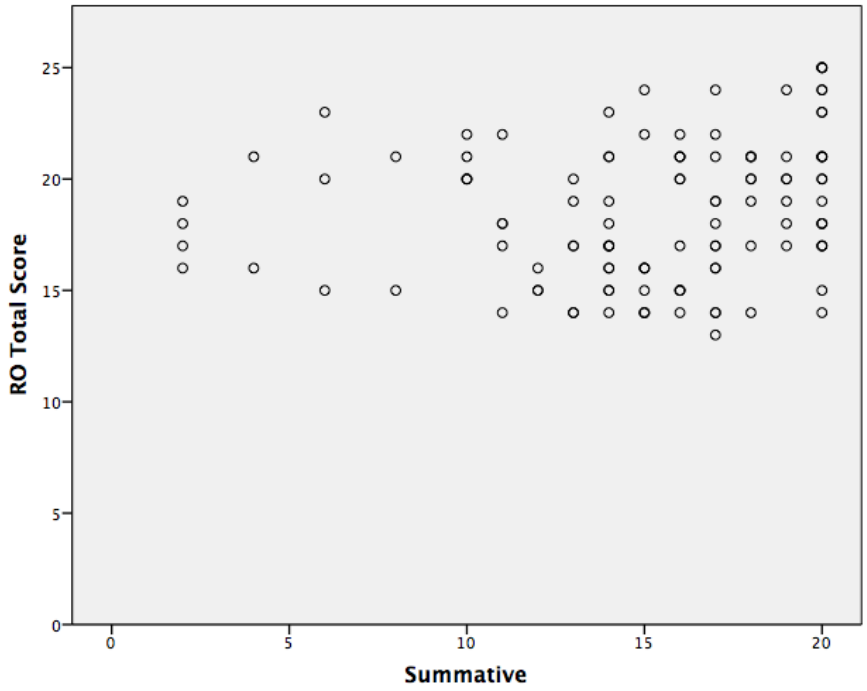
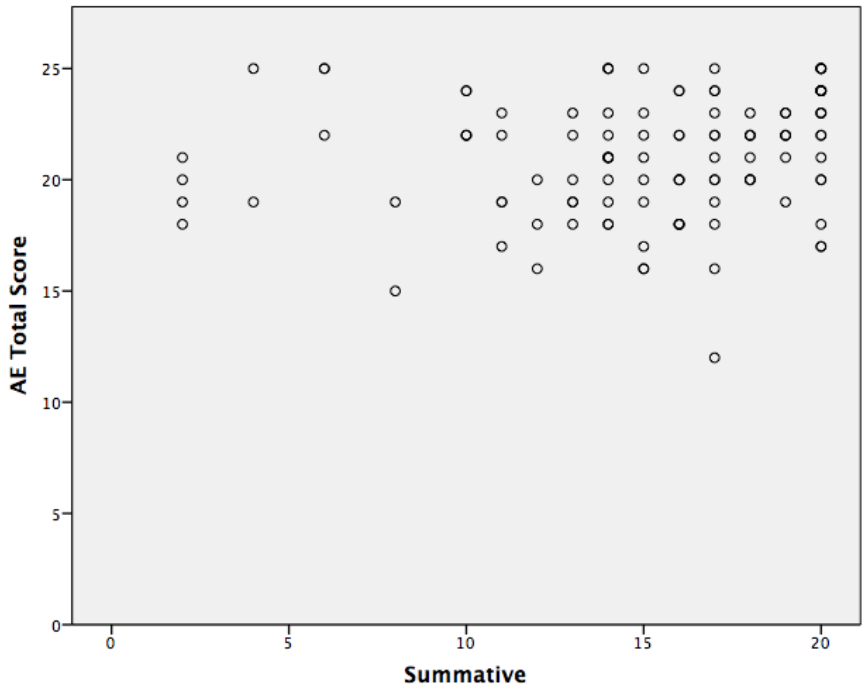


Figure 30

Scatterplot of AE Cluster Scores and Summative Assessment PLC Item Cluster Scores



APPENDIX D

PARTICIPANT CONSENT FORM

Teacher Learning within PLCs

Participation Consent Document - Please review and note your approval below to participate in the survey.
* Required

The study in which you are being asked to participate is designed to investigate connections between Professional Learning Community (PLC) structures and teacher learning. This study is being conducted for a doctoral degree program at California State University, San Bernardino, under the supervision of Dr. Donna Schnorr, Chair of the researcher's doctoral committee at California State University. The researcher's identity is being withheld in order to protect participant and researcher anonymity. This study has been approved by the Institutional Review Board, California State University, San Bernardino. PURPOSE: The purpose of this research is to identify and analyze teacher perceptions of their practice within PLCs and teacher learning within such systems. DESCRIPTION: You will be participating through completion of an online survey which requests your opinions regarding the collaborative systems in which your teacher team operates and your perceptions of your own learning within these systems. The survey is expected to take approximately fifteen (15) minutes to complete. There will be no identifiable information collected within the survey items. Participants may choose to discontinue the survey at any time. Participants may choose to not provide information during the survey process with no repercussion. PARTICIPATION: Participation in this study is completely voluntary. Participants may exit the study at any time without consequence or repercussion. An incentive raffle is available for participants as part of completing the survey. Following the survey, a link will be provided to a separate webpage containing information about the incentive raffle and a location to input information should a participant choose to enter the incentive raffle. Entries into the incentive raffle will be assigned a

number and a process of random selection using a random number generator will take place to select the winners. Duplicate entries into the incentive raffle will be removed prior to the selection process. Incentive winners will be notified via email of their prize during the week of March 30, 2015. All information collected for the incentive raffle will be stored separately from the survey data. CONFIDENTIALITY OR ANONYMITY: Data collected in the study will be kept secure by the researcher on the CSUSB accessed Google Drive. Data will be downloaded onto a flash drive, which will be securely locked within a file cabinet at the researcher's residence for storage and reference. No identifiable information will be collected within the survey. No individualized reporting will be created with the data. All reporting will be related to groups based on analyses conducted using the survey results. All data and the flash drives will be destroyed two years following publication of the study. Any paper copies that are generated will be securely stored in the same locked filing cabinet as the flash drives, and securely destroyed following publication of the study. DURATION: The survey is expected to last approximately fifteen (15) minutes per participant. The survey will take place during the CSUSB IRB approved survey window. RISKS: There are no foreseeable risks for the participants of this study. Should a participant determine that they are at risk during the study, the participant is asked to notify the Dr. Donna Schnorr immediately and/or remove themselves from the study. BENEFITS: The benefits of this research are to determine criteria and factors for teacher team construction that may be used by elementary administrators for constructing collaborative teams at their sites. In addition, the findings may assist teachers in determining their strengths in collaborative practice. CONTACT: Should you have questions or concerns regarding this survey, you may contact the supervisor of this study using the contact information below. Supervisor: Donna Schnorr, Ph.D. Title: Associate Professor & Co-Director for the Doctorate in Educational Leadership, College of Education, California State University, San Bernardino Email: dschnorr@csusb.edu Phone: 909-907-4231 RESULTS: Results of this study will be used for a published dissertation at California State University, San Bernardino, and possibly be presented (with no identifiable information) at appropriate professional conferences or in professional publications. Please send any request or questions to the supervisor of the study. CONFIRMATION STATEMENT: By selecting “yes”, I am indicating that I have read and understand the consent document and agree to participate in the study. I understand that I must be 18 years of age or older to participate in the study. *

NOTE: The survey must be completed and submitted in a single sitting. The survey does not allow participants to save thier data and complete items at a later time.

Mark only one oval.

- Yes, I understand that I must be 18 years of age or older to participate in this study, have read and understand the consent document above, and agree to participate in your study.
- I decline to participate in this study.

APPENDIX E

INSTITUTIONAL REVIEW BOARD LETTER

CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

Academic Affairs
Office of Academic Research • Institutional Review Board

February 02, 2015

CSUSB INSTITUTIONAL REVIEW BOARD
Administrative Review
IRB# 14052
Status
APPROVED

Mr. James F. Feffer and Dr. Donna Schnorr
Department of Education – Doctoral Program
California State University, San Bernardino
5500 University Parkway
San Bernardino, California 92407

Dear Mr. Feffer and Dr. Schnorr:

Your application to use human subjects, titled, "Teacher Learning within Professional Learning Communities" has been reviewed and approved by the Chair of the Institutional Review Board (IRB) of California State University, San Bernardino has determined that your application meets the requirements for exemption from IRB review Federal requirements under 45 CFR 46. As the researcher under the exempt category you do not have to follow the requirements under 45 CFR 46 which requires annual renewal and documentation of written informed consent which are not required for the exempt category. However, exempt status still requires you to attain consent from participants before conducting your research.

The CSUSB IRB has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval notice does not replace any departmental or additional approvals which may be required.

Your responsibilities as the researcher/investigator reporting to the IRB Committee include the following 4 requirements as mandated by the Code of Federal Regulations 45 CFR 46 listed below. Please note that the protocol change form and renewal form are located on the IRB website under the forms menu. Failure to notify the IRB of the above may result in disciplinary action. You are required to keep copies of the informed consent forms and data for at least three years. Please notify the IRB Research Compliance Officer for any of the following:

- **Submit a protocol change form if any changes (no matter how minor) are proposed in your research prospectus/protocol for review and approval of the IRB before implemented in your research,**
- **If any unanticipated/adverse events are experienced by subjects during your research, and**
- **When your project has ended by emailing the IRB Research Compliance Officer.**

If you have any questions regarding the IRB decision, please contact Michael Gillespie, the IRB Research Compliance Officer. Mr. Michael Gillespie can be reached by phone at (909) 537-7588, by fax at (909) 537-7028, or by email at mgillesp@csusb.edu. Please include your application approval identification number (listed at the top) in all correspondence.

Best of luck with your research.

Sincerely,

Judy Sylva

Judy Sylva, Ph.D.

IRB Chair, CSUSB Institutional Review Board

JS/mg

cc:

909.537.7588 • fax: 909.537.7028 • http://irb.csusb.edu/
5500 UNIVERSITY PARKWAY, SAN BERNARDINO, CA 92407-2393

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